



NCCN  
GUIDELINES  
FOR PATIENTS®

2023

# Inflammatory Breast Cancer



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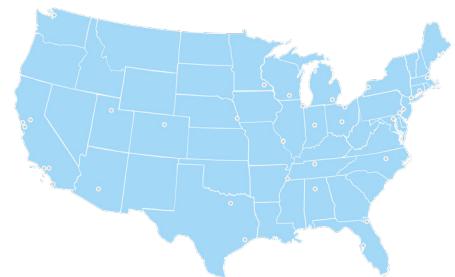


# About the NCCN Guidelines for Patients®



National Comprehensive  
Cancer Network®

Did you know that top cancer centers across the United States work together to improve cancer care? This alliance of leading cancer centers is called the National Comprehensive Cancer Network® (NCCN®).



Cancer care is always changing. NCCN develops evidence-based cancer care recommendations used by health care providers worldwide. These frequently updated recommendations are the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®). The NCCN Guidelines for Patients plainly explain these expert recommendations for people with cancer and caregivers.

**These NCCN Guidelines for Patients are based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer, Version 4.2023 – March 23, 2023.**

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# 1

## Breast cancer basics

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**Inflammatory breast cancer (IBC)** is a rare, aggressive cancer where cancer cells block lymph vessels in the skin of the breast. This causes the breast to look red and swollen and feel warm to the touch.

## The breast

The breast is an organ and a gland found on the chest. The breast is made of milk ducts, fat, nerves, lymph and blood vessels, ligaments, and other connective tissue. Behind

the breast is the pectoral (chest) muscle and ribs. Muscle and ligaments help hold the breast in place.

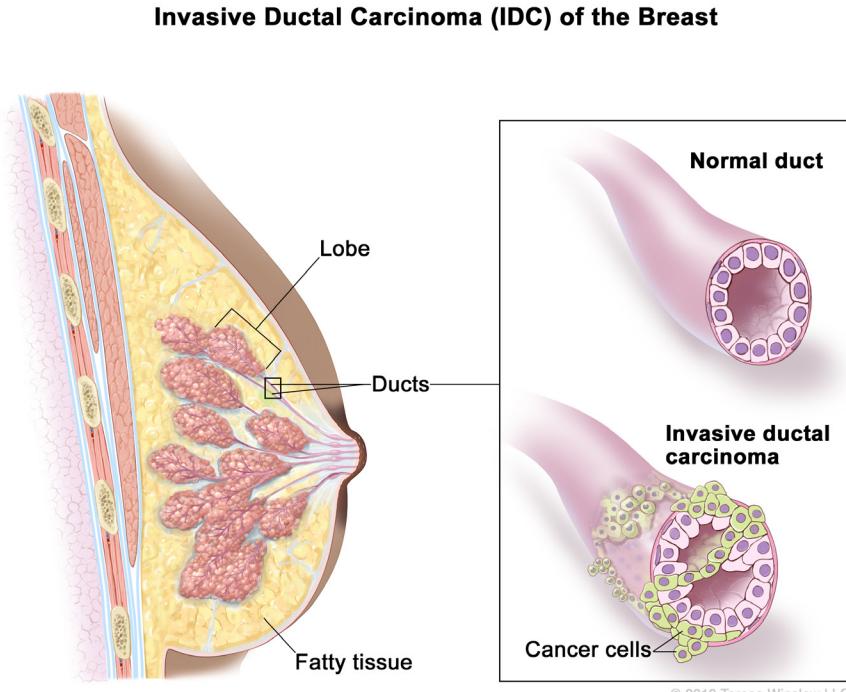
Breast tissue contains glands that can make milk. These milk glands are called lobules. Lobules look like tiny clusters of grapes. Small tubes called ducts connect the lobules to the nipple.

The ring of darker breast skin is called the areola. The raised tip within the areola is called the nipple. The nipple-areola complex (NAC) is a term that refers to both parts.

Lymph is a clear fluid that gives cells water and food. It also helps to fight germs. Lymph drains from breast tissue into lymph vessels and travels to lymph nodes near your armpit (axilla). Nodes near the armpit are called axillary lymph nodes (ALNs).

### Invasive ductal carcinoma

Most inflammatory breast cancers are invasive ductal carcinomas. This means that cancer started in the cells that line the milk ducts and has spread into surrounding tissue.



## Breast cancer

Breast cancer starts in the cells of the breast. Almost all breast cancers are a subtype called carcinomas. Carcinomas are cancers that start in the cells that line the inner or outer surfaces of the body.

There are different types of breast carcinoma. The most common types are either ductal or lobular.

- **Ductal carcinoma** starts in the cells that line the milk ducts. Milk ducts are thin tubes that carry milk from the lobules of the breast to the nipple. It is the most common type of breast cancer.
- **Lobular carcinoma** starts in the lobules (milk glands) of the breast. It is the second most common type of breast cancer.

## Inflammatory breast cancer

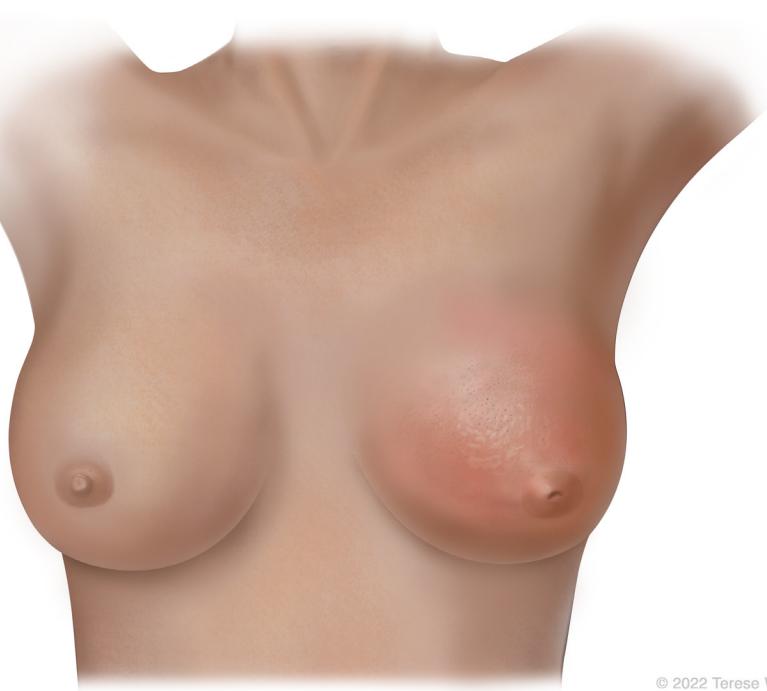
Most inflammatory breast cancers (IBCs) are invasive ductal carcinomas. This means that cancer started in the cells that line the milk ducts and has spread into surrounding tissue. It's important not to dismiss any strange skin changes to the breast, including redness, swollen nipple area, or warmth to the touch. Seek medical attention right away.

Possible signs of IBC:

- Peau d'orange (pitted or dimpled appearance of skin)
- Skin thickening (skin has an orange-peel texture)
- Edema (swelling caused by excess fluid in body tissue)
- Erythema (reddening of the skin, usually in patches)

### Inflammatory breast cancer

In inflammatory breast cancer (IBC), cancer cells block lymph vessels in the skin of the breast. This causes the breast to look red and swollen and feel warm to the touch.



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Like other breast cancers, IBC can happen in those assigned male at birth. Although there are some differences between those assigned male and those assigned female at birth, treatment is very similar for all genders.

## Key points

- Anyone can develop breast cancer, but breast cancer occurs more frequently in persons assigned female at birth.
- Inside breasts are lobules, ducts, fat, blood and lymph vessels, ligaments, and connective tissue. Lobules are structures that make breast milk. Ducts carry breast milk from the lobules to the nipple.
- Breast cancer often starts in the ducts or lobules and then spreads into the surrounding tissue.
- In inflammatory breast cancer (IBC), cancer cells block lymph vessels in the skin of the breast. This causes the breast to look red and swollen and feel warm to the touch.

“

For weeks my bra had been feeling uncomfortably tight. I tried to ignore it but then felt sharp, shooting pains and the skin looked 'funny.' It took multiple office visits and finally to a surgeon to learn I had inflammatory breast cancer (IBC). I'm a nurse and didn't know you could have breast cancer without a lump."

# 2

## Testing for IBC

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**Treatment planning starts with testing. This chapter presents an overview of the tests you might receive and what to expect.**

IBC can be difficult to diagnose. Often, there is no lump that can be felt during a breast exam or seen on a mammogram. Since there is swelling (edema) and redness (erythema) of the breast, IBC can look like an infection and therefore be difficult to diagnose. Often, a biopsy of the affected skin is done to diagnose the tumor.

## Test results

You will have blood tests, imaging tests, and a biopsy to stage the cancer. The biopsy sample will be tested for hormone receptors (estrogen and progesterone) and HER2 receptors. Treatment will be based on these findings.

It is important you understand what these tests mean. Ask questions and keep copies of your test results. Online patient portals are a great way to access your test results.

Keep these things in mind:

- Choose a friend, family member, or peer who can drive you to appointments, provide meals, or offer emotional support during diagnosis and treatment.
- Bring someone with you to doctor visits, if possible.

- Write down questions and take notes during appointments. Don't be afraid to ask your care team questions. Get to know your care team and help them get to know you.
- Get copies of blood tests, imaging results, and reports about the specific type of cancer you have.
- Organize your papers. Create files for insurance forms, medical records, and test results. You can do the same on your computer.
- Keep a list of contact information for everyone on your care team. Add it to your phone. Hang the list on your refrigerator or keep it in a place where someone can access it in an emergency. Keep your primary care physician (PCP) informed of changes to this list.
- Include in your contact list information on the exact type of cancer, as well as any treatments and the date they started.

For possible tests, **see Guide 1**.

# General health tests

## Medical history

A medical history is a record of all health issues and treatments you have had in your life. Be prepared to list any illness or injury and when it happened. Bring a list of old and new medicines and any over-the-counter (OTC) medicines, herbals, or supplements you take. Some supplements interact and affect medicines that your care team may prescribe. Tell your care team about any symptoms you have. A medical history, sometimes called a health history, will help determine which treatment is best for you.

## Family history

Some cancers and other diseases can run in families. Your doctor will ask about the health history of family members who are blood relatives. This information is called a family history. Ask family members on both sides of your family about their health issues like heart disease, cancer, and diabetes, and at what age they were diagnosed. It's important to know the specific type of cancer, or where the cancer started, and if it is in multiple locations, and if they had genetic testing.

### Guide 1 Possible tests

Medical history and physical exam (H&P) by multidisciplinary team. Medical photographs will also be taken.

Complete blood count (CBC), comprehensive metabolic panel (CMP) including liver function tests (LFTs), and alkaline phosphatase

Biopsy with pathology review

Determine tumor status including:

- Estrogen receptor (ER) and progesterone receptor (PR) hormone receptor (HR) status
- HER2 status

Address fertility, birth control, and sexual health concerns

Genetic counseling and testing if at risk for hereditary breast cancer

Imaging:

- Diagnostic mammogram. Ultrasound and breast MRI, as needed
- Chest CT. Contrast might be used.
- CT or MRI of abdomen with or without pelvis. Contrast will be used.
- Bone scan or PET-CT

## Physical exam

During a physical exam, your health care provider may:

- Check your temperature, blood pressure, pulse, and breathing rate
- Check your height and weight
- Listen to your lungs and heart
- Look in your eyes, ears, nose, and throat
- Feel and apply pressure to parts of your body to see if organs are of normal size, are soft or hard, or cause pain when touched.
- Examine your breasts to look for lumps, nipple discharge or bleeding, or skin changes.
- Feel for enlarged lymph nodes in your neck, underarm, and groin.

## Clinical breast exam

Clinical breast exam (CBE) is a physical exam of the bare breast performed by a health care provider to check for lumps or other changes. It is done while you are seated and/or lying down. Your provider should take time to palpate (feel) the entire breast, including the armpit. A nurse or assistant might also be in the room during the exam.



## Create a medical binder

A medical binder or notebook is a great way to organize all of your records in one place.

- ✓ Make copies of blood tests, imaging results, and reports about your specific type of cancer. It will be helpful when getting a second opinion.
- ✓ Choose a binder that meets your needs. Consider a zipper pocket to include a pen, small calendar, and insurance cards.
- ✓ Create folders for insurance forms, test types (ie, blood, imaging, pathology, radiology, genetics), treatments, and procedures. Organize items in the folder by date.
- ✓ Use online patient portals to view your test results and other records. Download or print the records to add to your binder.
- ✓ Add a section for questions and to take notes.

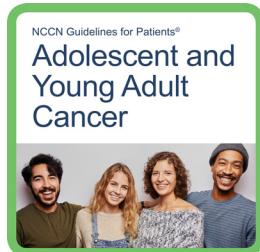
Bring your medical binder to appointments. You never know when you might need it!

## Fertility (all genders)

Treatment such as chemotherapy can affect your fertility, the ability to have children. If you think you want children in the future, ask your care team how cancer and cancer treatment might change your fertility. To preserve your fertility, you may need to take action before starting cancer treatment. Those who want to have children in the future should be referred to a fertility specialist to discuss the options before starting treatment.

Fertility preservation is all about keeping your options open, whether you know you want to have children later in life or aren't really sure at the moment. Fertility and reproductive specialists can help you sort through what may be best for your situation.

More information on fertility preservation in adolescents and young adults can be found at [NCCN.org/patientguidelines](https://www.NCCN.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.



## Changes in fertility

Treatment might cause your fertility to be temporarily or permanently impaired or interrupted. This loss of fertility is related to your age at time of diagnosis, treatment type(s), treatment dose, and treatment length. Talk to your care team about your concerns and if you are planning a pregnancy.

## Preventing pregnancy during treatment

Preventing pregnancy during treatment is important. Cancer and cancer treatment can affect the ovaries and damage sperm. Hormonal birth control may or may not be recommended, so ask your doctor about options such as intrauterine devices (IUDs) and barrier methods. Types of barrier methods include condoms, diaphragms, cervical caps, and the contraceptive sponge.

### Those with ovaries

Those who can become pregnant will have a pregnancy test before starting treatment. Cancer treatment can hurt the developing baby if you are or become pregnant during treatment. Therefore, birth control to prevent pregnancy during and after treatment is recommended. Non-hormonal birth control methods (barrier methods, IUDs) are preferred after a breast cancer diagnosis. If you are pregnant or breastfeeding at the time of your cancer diagnosis, certain treatments will need to be avoided.

Menstruation, menses, menstrual flow, or your “period” may stop during treatment, but often returns within 2 years after treatment in those 35 years of age and under. It is still possible to become pregnant even though you might not have a period. Therefore, birth control is recommended during and after treatment. Consult your doctor for the best time to plan a pregnancy.

### Those with testicles

Cancer and cancer treatment can damage sperm. Therefore, use contraception (birth control) such as condoms and IUDs to prevent

pregnancy during and immediately after cancer treatment.

## Blood tests

Blood tests check for signs of disease and how well organs are working. They require a sample of your blood, which is removed through a needle placed into your vein. Some blood tests you might have are described next.

### Alkaline phosphatase

Alkaline phosphatase (ALP) is an enzyme found in the blood. High levels of ALP can be a sign cancer has spread to the bone or liver. A bone scan might be performed if you have high levels of ALP.

### Complete blood count

A complete blood count (CBC) measures the levels of red blood cells (RBCs), white blood cells (WBCs), and platelets (PLTs) in your blood. Red blood cells carry oxygen throughout your body, white blood cells fight infection, and platelets control bleeding.

### Comprehensive metabolic panel

A comprehensive metabolic panel (CMP) measures 14 different substances in your blood. It is usually done on the plasma part of your blood. A CMP provides important information about how well your kidneys and liver are working, among other things.

### Liver function tests

Liver function tests (LFTs) look at the health of your liver by measuring chemicals that are made or processed by the liver. Levels that are too high or low signal that the liver is not working well or that cancer has spread to the liver.

### Pregnancy test

Those who can become pregnant will be given a pregnancy test before treatment begins.

Those who want to have children in the future should be referred to a fertility specialist before starting treatment.



## Imaging tests

Imaging tests take pictures of the inside of your body. Imaging tests show the primary tumor, or where the cancer started, and look for cancer in other parts of the body.

A radiologist, an expert in interpreting imaging tests, will write a report and send this report to your doctor. The doctor will discuss the results with you. While these reports are available to you through your patient portal, please wait to discuss these results with the doctor.

The following imaging tests are not in order of importance. You will not have all of these tests.

### Bone scan

A bone scan uses a radiotracer. A radiotracer is a substance that releases small amounts of radiation. Before the pictures are taken, the tracer will be injected into your vein. It can take a few hours for the tracer to enter your bones. However, the test is quick and painless.

A special camera will take pictures of the tracer in your bones as it moves over your body. Areas of bone damage take up more radiotracer than healthy bone and show up as bright spots on the pictures. Bone damage can be caused by cancer, cancer treatment, previous injuries, or other health issues.

### Bone x-ray

An x-ray uses low-dose radiation to take one picture at a time. A tumor changes the way radiation is absorbed and will show up on the x-ray. X-rays are also good at showing bone issues. Your care team may order x-rays if your bones hurt or were abnormal on a bone scan.

### Diagnostic mammogram

A mammogram is a picture of the insides of your breast. The pictures are made using x-rays. A computer combines the x-rays to make detailed pictures. A bilateral mammogram includes pictures of both breasts. Mammogram results are used to plan treatment.

Diagnostic mammograms look at specific areas of your breasts, which may not be clearly seen on screening mammograms. They are used to see tumor and the size of the tumor(s). Diagnostic mammograms include extra compression in certain areas of the breast, magnification views, or rolling the breast to image additional areas of the breast. Other tests may include a breast MRI or ultrasound.

### MRI scan

A magnetic resonance imaging (MRI) scan uses radio waves and powerful magnets to take pictures of the inside of the body. It does not use x-rays. Because of the very strong magnets used in the MRI machine, tell the technologist if you have any metal in your body. During the test, you will likely be asked to hold your breath for 10 to 20 seconds as the technician collects the images. Contrast is often used.

A closed MRI has a capsule-like design where the magnet surrounds you. An open MRI has a magnetic top and bottom, which allows for an opening on each end. Closed MRIs are more common than open MRIs, so if you have claustrophobia (a dread or fear of enclosed spaces), be sure to talk to your care team about it.

## Breast MRI

If needed, a breast MRI will be used in addition to a mammogram. Contrast should be used. You will be positioned face down in the machine with your arms above your head.

## Spine and brain MRI

An MRI can be used to detect breast cancer that has spread (metastasized) to your spine or brain. For a brain MRI, a device is placed around your head. For a spine MRI, no device is worn. Contrast should be used in an MRI.

## CT scan

A computed tomography (CT or CAT) scan uses x-rays and computer technology to take pictures of the inside of the body. It takes many x-rays of the same body part from different angles. All the images are combined to make one detailed picture. Intravenous (IV) contrast is often used.

## Contrast material

Contrast material is used to improve the pictures of the inside of the body. Contrast materials are not dyes, but substances that help enhance and improve the images of several organs and structures in the body. It is used to make the pictures clearer. The contrast is not permanent and will leave the body in your urine immediately after the test. The types of contrast vary and are different for CT and MRI.

Tell your doctors if you have had allergic reactions to contrast in the past, especially to iodine or to shellfish such as shrimp. This is important. You might be given medicines to avoid the effects of those allergies. Contrast

## What's the difference between a screening and diagnostic mammogram?

A mammogram is a picture of the inside of your breast made using x-rays. During a mammogram, the breast is pressed between two plates while you stand in different positions. Multiple x-rays will be taken. A computer combines the x-rays to make detailed pictures.

- Screening mammograms are done on a regular basis when there are no signs or symptoms of breast cancer. Results take a few days.
- Diagnostic mammograms are used for those who have symptoms such as a lump, pain, nipple thickening or discharge, or whose breasts have changed shape or size.
- Diagnostic mammograms are also used to take a closer look at an abnormal area found in a screening mammogram.
- A radiologist will evaluate the diagnostic mammogram while you wait so if additional testing is needed, it can be done right away.
- Both types of mammograms use low-dose x-rays to examine the breast. They may use either the standard 2-dimensional (2D) digital mammography or 3-dimensional (3D) mammograms known as tomosynthesis.

might not be used if you have a serious allergy or if your kidneys aren't working well.

### PET scan

A positron emission tomography (PET) scan uses a radioactive drug called a tracer. A tracer is a substance injected into a vein to see where cancer cells are in the body and if they are using sugar produced by your body to grow. Cancer cells show up as bright spots on PET scans. However, not all tumors will appear on a PET scan. Also, not all bright spots are cancer. It is normal for the brain, heart, kidneys, and bladder to be bright on PET. Inflammation or infection can also show up as a bright spot. When a PET scan is combined with CT, it is called a PET-CT scan. It may be done with one or two machines depending on the cancer center.

### Sodium fluoride PET-CT

A sodium fluoride PET-CT might be used instead of a bone scan. In this test, the radiotracer is made of sodium fluoride.

### FDG PET-CT

An FDG PET-CT uses a radiotracer called F-18 fluorodeoxyglucose (FDG). It is made of fluoride and a simple form of sugar called glucose. You cannot eat or drink for at least 4 hours before the scan. This scan is most helpful when other imaging results are unclear. It may help find cancer in lymph nodes and distant sites. If it clearly shows cancer in the bone, a bone scan and sodium fluoride PET-CT may not be needed. FDG PET-CT can be done at the same time as a CT used for diagnosis.

### FES PET-CT

FES is a radioactive form of the hormone estrogen. It might be used instead of FDG PET-CT when cancer is estrogen receptor-positive (ER+).

Inflammatory breast cancer can be difficult to diagnose. Ask for a referral to a breast specialist, if possible.

### Ultrasound

An ultrasound (US) uses high-energy sound waves to form pictures of the inside of the body. This is similar to the sonogram used for pregnancy. A wand-like probe (transducer) will be held and moved on your bare breast using gel. It may also be placed below your armpit. Ultrasound is painless and does not use x-rays, so it can be repeated as needed. Ultrasound is good at showing small areas of cancer that are near the skin. Sometimes, a breast ultrasound or MRI is used to guide a biopsy.

## Biopsy

A biopsy is a procedure that removes a sample of tissue or fluid. The sample is sent to a lab for testing. A pathologist will examine the biopsy for cancer and write a report called a pathology report. Ask questions about your biopsy results and what it means for your treatment.

There are different types of biopsies. Some biopsies are guided using imaging, such as mammogram, ultrasound, or MRI. The primary or main tumor is biopsied first. Other tumors or tumors in different areas may also be biopsied. You may have tissue removed from the breast, lymph nodes, or both.

Types of possible biopsies include:

- **Fine-needle aspiration (FNA) or core biopsy (CB)** uses needles of different sizes to remove a sample of

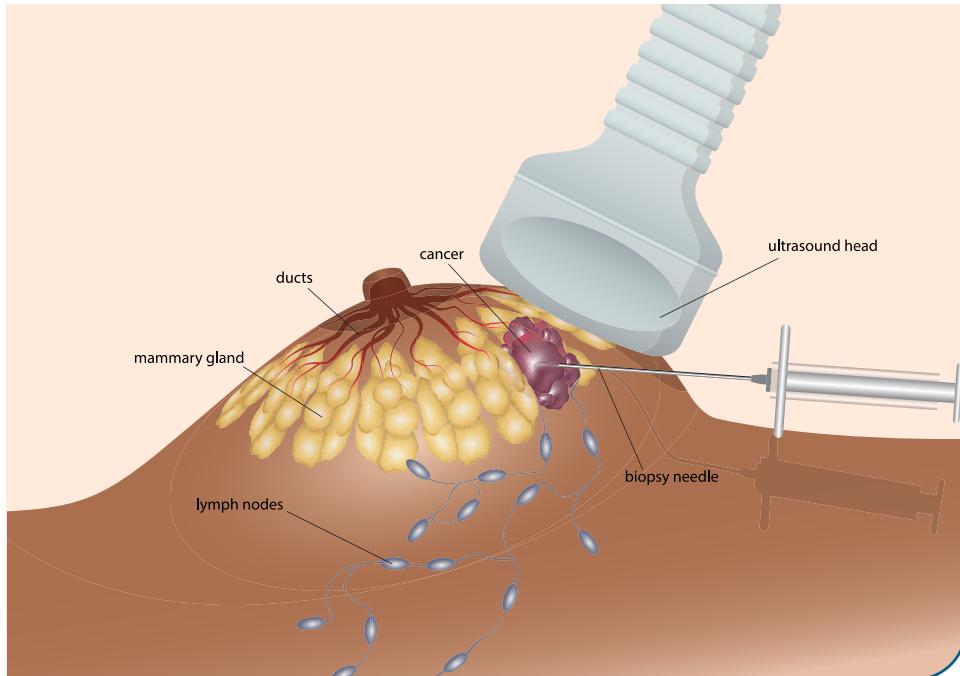
tissue or fluid. In a vacuum-assisted core biopsy (VACB), suction is used to remove the sample with a special vacuum device.

- **Incisional biopsy** removes a small amount of tissue through a cut in the skin or body.
- **Excisional biopsy** removes the entire abnormal area. This is not the preferred type of biopsy but may be necessary if other methods are not possible or when the biopsy results don't match the expected findings.
- **Skin biopsy** takes a small sample of inflamed skin on the breast.

Before biopsies are performed, usually the area is injected with numbing medicine. A core needle biopsy (CNB) removes more than one tissue sample, but usually through the same area on the breast. The samples are small.

## Biopsy

**In a biopsy, a sample of tumor is removed. There are different types of biopsy. This image shows an ultrasound-guided needle biopsy.**



The needle is often guided into the tumor with imaging. When mammography is used during a biopsy, it is called a stereotactic needle biopsy.

One or more clips may be placed near the breast tumor during a biopsy. The clips are small, painless, and made of metal. They will mark the site for future treatment and imaging. The clips will stay in place until surgery. If the area biopsied is benign, the clip will remain in place to mark the biopsy site on future imaging. The clips cause no problems, even if they are left in place for a long time. You will be able to go through airport security and have an MRI.

There are both physical and emotional experiences in having biopsies. You may need to rest and place an ice pack on the biopsy area after the procedure. If you are working or have other commitments, you may want to take the day off to recover emotionally and physically from the experience.

### Axillary lymph node needle biopsy

An axillary lymph node (ALN) drains lymph fluid from the breast and nearby areas. In an axillary lymph node biopsy, a sample of lymph node near the armpit (axilla) is biopsied with a needle. This is to determine if abnormal lymph nodes seen on imaging tests contain cancer cells. An ultrasound-guided fine-needle aspiration (US-FNA) or core biopsy will be used. If cancer is found, it is called node positive (node+). A marker may be placed in the node so that it can be identified later if needed.

**Standard of care is the best known way to treat particular disease based on past clinical trials. There may be more than one treatment regimen that is considered standard of care. Ask your care team what treatment options are available and if a clinical trial might be right for you.**



## Sentinel lymph node biopsy

A sentinel lymph node (SLN) is the first lymph node that cancer cells are most likely to spread to from a primary tumor. Sometimes, there can be more than one sentinel lymph node. Removal of the sentinel lymph nodes during surgery is called a sentinel lymph node biopsy (SLNB or SNB). This procedure is done during surgery such as a mastectomy (surgery to remove the breast) or lumpectomy (surgery to remove the tumor) to determine if any cancer cells have traveled to the lymph nodes. The lymph nodes removed are called the sentinel nodes. They may or may not contain any cancer cells. Just because these nodes are removed, it does not mean that they are positive for cancer.

To find the sentinel lymph nodes, a radioactive material and other dyes are injected into the area where breast tumor is located. From here, the dye travels through the lymphatics in the breast to the lymph nodes. This helps the surgeon find which of the nodes are the sentinel lymph nodes. Once the nodes are found, those containing the radioactive material or dye are removed and tested by a pathologist. If cancer is found, then more than the sentinel lymph nodes may be removed.

## Skin biopsy

A sample of inflamed skin on the breast will likely be removed to diagnose inflammatory breast cancer.

## Biopsy results

Histology is the study of the anatomy (structure) of cells, tissues, and organs under a microscope. It is used to make treatment decisions. Your pathology report will contain information about histology. You may be recommended to have an open biopsy (surgery) to remove (excise) the tumor to confirm histology. Talk to your health care provider for more information on next steps.

## Hormone receptor status

A hormone is a substance made by a gland in your body. Your blood carries hormones throughout your body. A receptor is a protein found inside or on the surface of a cell.

Substances such as hormones attach (bind) to these receptors. This causes changes within the cell.

Hormones recognize and bind to specific hormone receptors. When hormones attach to receptors on breast cancer cells, they can cause cancer to grow. If found, these receptors may be targeted using endocrine therapy.

There are 2 types of hormone receptors:

- **Estrogen** – plays a role in breast development
- **Progesterone** – plays a role in menstrual cycle and pregnancy

Hormone receptor (HR) testing should be done on any new tumors. A biopsy sample will be used.

## Hormone receptor-positive

In hormone receptor-positive (HR+) breast cancer, IHC finds estrogen and/or progesterone hormone receptors. Most breast cancers are HR+.

- **Estrogen receptor (ER)** is stimulated by estrogen and provides survival and proliferation (rapid growth) signals. Cancer cells deprived of estrogen or which have their ER signal blocked with treatment may stop growing or die.
- **Progesterone receptor (PR)** binds progesterone and also provides survival and proliferation signals. It is thought that PR expression also suggests the tumor is estrogen dependent.

HR+ breast cancer is treated with endocrine therapy, which blocks estrogen receptor signaling.

## Hormone receptor-negative

Hormone receptor-negative (HR-) breast cancer cells do not have either estrogen or progesterone hormone receptors. These cancers are sometimes simply called hormone negative. HR- cancers often grow faster than HR+ cancers. Both the estrogen and progesterone receptors need to be negative for the cancer to be considered HR-.

### Estrogen receptor-positive (ER+) breast cancer cells

- ✓ In ER+ breast cancer, testing finds estrogen hormone receptors in at least 1 out of every 100 cancer cells.
- ✓ In ER-low-positive invasive breast cancer, testing finds estrogen hormone receptors in 1 to 10 out of every 100 cancer cells.
- ✓ Endocrine therapy might not be recommended for ER-low-positive invasive breast cancer.

## HER2 status

Inflammatory breast cancers often produce greater than normal amounts of HER2. Human epidermal growth factor receptor 2 (HER2) is a protein involved in normal cell growth. It is found on the surface of all cells. When amounts are high, it causes cells to grow and divide. Some breast cancers have too many HER2 genes or receptors. Too many HER2s is called HER2-positive (HER2+). You might hear it called HER2 overexpression or amplification.

There are 2 tests for HER2:

- **Immunohistochemistry (IHC)** measures receptors. If the IHC score is 3+, the cancer is HER2+. If the score is 0 or 1, it is considered HER2-. If the score is 2+, further testing is needed.
- **In situ hybridization (ISH)** counts the number of copies of the HER2 gene. This test is done mainly when the IHC score is unclear.

HER2 testing should be done on all new tumors. A tumor biopsy sample will be used. You might have more than one HER2 test.

### Immunohistochemistry

Immunohistochemistry (IHC) is a special staining process that involves adding a chemical marker to cells. These cells are then studied using a microscope. IHC can find estrogen, progesterone, and HER2 receptors in breast cancer cells. A pathologist will measure how many cells have estrogen and/or progesterone receptors and the number of receptors inside each cell.

## Biomarker testing

A sample from a biopsy of your tumor may be tested to look for specific DNA (deoxyribonucleic acid) mutations/alterations, protein levels, or other molecular features. This information is used to choose the best treatment for you. It is sometimes called molecular testing or tumor profiling, tumor sequencing, gene expression profiling, or genomic testing.

Biomarker testing includes tests of genes or their products (proteins). It identifies the presence or absence of mutations and certain proteins that might suggest treatment. Proteins are written like this: BRCA. Genes are written with italics like this: *BRCA*. HER2 and hormone receptor status are part of biomarker testing. Your treatment team will recommend the best types of biomarker testing that are important for you.

### Tumor markers

Your blood or biopsy tissue may be tested for proteins. Examples of some tumor markers in breast cancer include carcinoembryonic antigen (CEA), CA 15-3, and CA 27.29. An increase in the level of certain tumor markers could mean that the cancer has grown or spread (progressed). However, not everyone has elevated levels of these markers and tumor markers alone are not a reliable method of detecting breast cancer.

### Tumor mutational burden

When there are 10 or more mutations per million base pairs of tumor DNA, it is called tumor mutational burden-high (TMB-H). TMB-H can be used to help predict response to cancer treatment using immune checkpoint inhibitors that target the proteins called programmed

death protein 1 (PD-1) and programmed death-ligand 1 (PD-L1).

### Tumor mutation testing

A sample of your tumor or blood may be used to see if the cancer cells have any specific DNA mutations. This is a different type of DNA testing than the genetic testing for mutations you may have inherited from your parents. In tumor mutation testing, only the tumor is tested and not the rest of your body. Certain mutations such as PIK3CA can be targeted with specific therapies.

### MSI-H/dMMR mutation

Microsatellites are short, repeated strings of DNA. When errors or defects occur, they are fixed by mismatch repair (MMR) proteins. Some cancers have DNA mutations for changes that prevent these errors from being fixed. This is called microsatellite instability (MSI) or deficient mismatch repair (dMMR). When cancer cells have more than a normal number of microsatellites, it is called MSI-H (microsatellite instability-high). This is often due to dMMR genes.

### PD-1 and PD-L1 testing

Programmed death protein 1 (PD-1) and programmed death-ligand 1 (PD-L1) are immune proteins. If either protein is expressed on the surface of cancer cells, it can cause your immune cells to ignore the cancer and suppress the anti-tumor immune response. If your cancer expresses either protein, you might have treatment that combines chemotherapy and a checkpoint inhibitor therapy. This is designed to activate your immune system to better fight off the cancer cells.

### FISH

Fluorescence in situ hybridization (FISH) is a testing method that involves special dyes called probes that attach to pieces of DNA, the genetic material in a person's cells.

### Immunohistochemistry

Immunohistochemistry (IHC) is a special staining process that involves adding a chemical marker to cancer or immune cells. The cells are then studied using a microscope.

### Next-generation sequencing

Next-generation sequencing (NGS) is a high-throughput method used to determine the DNA sequence or gene changes of cancer cells in your tumor. This method would only be used if enough tumor tissue remains after other biomarker testing has been completed.

### PCR

A polymerase chain reaction (PCR) is a lab process that can make millions or billions of copies of your DNA (genetic information). PCR is very sensitive. It can find 1 abnormal cell among more than 100,000 normal cells. These copies called PCR product might be used for NGS.

## Genetic risk testing

About 1 out of 10 breast cancers are hereditary. Depending on your family history or other features of your cancer, your health care provider might refer you for hereditary genetic testing to learn more about your cancer. A genetic counselor or trained provider will speak to you about the results. Test results may be used to guide treatment planning.

Genetic testing is done using blood or saliva (spitting into a cup or a cheek swab). The goal is to look for gene mutations inherited from your biological parents called germline mutations. Some mutations can put you at risk for more than one type of cancer. You can pass these genes on to your children. Also, other family members might carry these mutations. Tell your care team if there is a family history of cancer.

### **BRCA tests**

Everyone has *BRCA* genes. Normal *BRCA* genes help to prevent tumor growth. They help fix damaged cells and help cells grow normally. *BRCA* mutations put you at risk for more than one type of cancer. Mutations in *BRCA1* or *BRCA2* increase the risk of breast, ovarian, prostate, colorectal, pancreatic, and melanoma skin cancers. Mutated *BRCA* genes can also affect how well some treatments work. These tests might be repeated.



### **What is your family cancer health history?**

Some cancers and other diseases run in families—those who are related to you through genes passed down from biological parent to child. This information is called a family health history. Ask blood relatives about their health issues like heart disease, cancer, and diabetes, and at what age they were diagnosed. For relatives who were diagnosed with cancer, ask them (or other relatives if they are no longer living) what type of cancer they had, if they died from the cancer, and at what age the cancer was diagnosed.

Start by asking your parents, siblings, and children. Next, talk to half-siblings, aunts and uncles, nieces and nephews, grandparents, and grandchildren.

Write down what you learn about your family history and share this information with your health care provider.

Some of the questions to ask include:

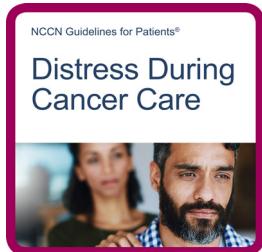
- ✓ How old were you when each of these diseases and health conditions was diagnosed?
- ✓ What is our family's ancestry – from what countries did our ancestors originate?

## Distress screening

It is normal to have strong feelings about being diagnosed with cancer and your feelings can also change from day to day and week to week. Talk to your care team and those whom you feel most comfortable about how you are feeling. There are services and people who can help you. Support and counseling are available. Dealing with a cancer diagnosis may sometimes be stressful and may cause distress. Your treatment team will screen your level of distress. This is part of your cancer care.

Distress is an unpleasant experience of a mental, physical, social, or spiritual nature. It can affect how you feel, think, and act. Distress might include feelings of sadness, fear, helplessness, worry, anger, and guilt. You may also experience depression, anxiety, and sleep issues.

More information on distress can be found at [NCCN.org/patientguidelines](https://www.NCCN.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.



## Performance status

Performance status (PS) is a person's general level of fitness and ability to perform daily tasks. Your state of general health will be rated using a PS scale called ECOG (Eastern Cooperative Oncology Group). PS is one factor taken into consideration when choosing a treatment plan. Your preferences about treatment are always important.

### ECOG PS

The ECOG PS scores range from 0 to 5.

- **PS 0** means the person is fully active.
- **PS 1** means the person is still able to perform light to moderate activity, but with some limitations.
- **PS 2** means the person is limited to the chair or bed less than half of the time and is still able to care for self.
- **PS 3** means the person is limited to the chair or bed more than half of the time.
- **PS 4** means the person is totally confined to the bed or chair and completely unable to care for self.
- **PS 5** means the person is not alive.

In breast cancer, PS might be referred to as good or poor. Good PS is usually PS 0 or PS 1.

## Key points

- Tests are used to find cancer, plan treatment, and check how well treatment is working.
- You will have a physical exam, including a breast exam, to see if anything feels or looks abnormal.
- Treatment can affect your fertility, the ability to have children.
- Blood tests check for signs of disease and how well organs are working.
- Imaging tests take pictures of the inside of your body.
- A diagnostic mammogram includes detailed pictures of both breasts. It is different than a screening mammogram.
- During a biopsy, tissue or fluid samples are removed for testing. Samples are needed to confirm the presence of cancer and to perform cancer cell tests.
- A sample from a biopsy of your tumor will be tested for estrogen receptor (ER) status, progesterone receptor (PR) status, HER2 status, and grade (histology). This provides information about the behavior of your cancer, as well as treatments to which your cancer may respond.
- About 1 out of 10 breast cancers are hereditary. Depending on your family history or other features of your cancer, your health care provider might refer you for hereditary genetic testing or to speak with a genetic counselor.

- A sentinel lymph node (SLN) is the first lymph node(s) that cancer cells are most likely to spread to from a primary tumor. A sentinel lymph node biopsy (SNLB) might be done to look for cancer in your lymph node(s).
- Online portals are a great way to access your test results.

Testing takes time. It might take days or weeks before all test results come in.

# 3

## Breast cancer staging

27 How breast cancer is staged

28 TNM scores

31 Key points

**Cancer staging is used to reflect prognosis and to guide treatment decisions. It describes the size and location of the tumor and if cancer has spread to lymph nodes, organs, or other parts of the body. It also takes into account hormone receptor and HER2 status.**

Most inflammatory breast cancers (IBCs) are invasive ductal carcinomas. This means that cancer started in the cells that line the milk ducts and has spread into surrounding tissue. At diagnosis, IBC is stage 3 or 4 disease. In stage 3, the tumor can be any size and in the lymph nodes, the lymph nodes can be fixed (or not moveable), or the cancer can involve the skin or chest wall. It is sometimes called advanced disease. In stage 4, cancer has spread to other parts of the body (metastasized).

## How breast cancer is staged

A cancer stage is a way to describe the extent of the cancer at the time you are first diagnosed. The American Joint Committee on Cancer (AJCC) created a staging system to determine how much cancer is in your body, where it is located, and what subtype you have. This is called staging.

Based on testing, your cancer will be assigned a stage. Staging helps to predict prognosis and is needed to make treatment decisions. A

prognosis is the course your cancer will likely take. AJCC is just one type of staging system.

Staging includes:

- **Anatomic** – based on extent of cancer as defined by tumor size (T), lymph node status (N), and distant metastasis (M).
- **Prognostic** – includes anatomic TNM plus tumor grade and the status of the biomarkers such as human epidermal growth factor receptor 2 (HER2), estrogen receptor (ER), and progesterone receptor (PR). Prognostic stage also includes the assumption that you are treated with the standard-of-care approaches.

Prognostic stages are divided into clinical and pathologic. Pathologic stage applies to those who have undergone surgery as the initial treatment for breast cancer. Breast cancer staging is often done twice, before and after surgery. Staging after surgery provides more specific and accurate details about the size of the cancer and lymph node status.

- **Clinical stage (c)** is the rating given before any treatment. It is based on a physical exam, biopsy, and imaging tests. An example might look like cN2 or cM1.
- **Pathologic stage (p)** or surgical stage is determined by examining tissue removed during surgery. An example might be pN2. If you are given drug therapy before surgery, then the stage might look like ypT3.

Staging is based on a combination of information to reach a final numbered stage. Often, not all information is available at the initial evaluation. More information can be gathered as treatment begins. Doctors may explain your cancer stage in different ways than described next.

Information gathered during staging:

- **The extent (size) of the tumor (T):** How large is the cancer? Has it grown into nearby areas?
- **The spread to nearby lymph nodes (N):** Has the cancer spread to nearby lymph nodes? If so, how many? Where?
- **The spread (metastasis) to distant sites (M):** Has the cancer spread to distant organs such as the lungs or liver?
- **Estrogen receptor (ER) status:** Does the cancer have the protein called an estrogen receptor?
- **Progesterone receptor (PR) status:** Does the cancer have the protein called a progesterone receptor?
- **Human epidermal growth factor receptor 2 (HER2) status:** Does the cancer make too much of a protein called HER2?
- **Grade of the cancer (G):** How much do the cancer cells look like normal cells?
- **Biomarker testing:** Does the cancer have any genes, proteins, markers, or mutations that might suggest treatment?

## TNM scores

The tumor, node, metastasis (TNM) system is used to stage breast cancer. In this system, the letters T, N, and M describe different areas of cancer growth. Based on cancer test results, your doctor will assign a score or number to each letter. The higher the number, the larger the tumor or the more the cancer has spread. These scores will be combined to assign the cancer a stage. A TNM example might look like this: T3N2M0 or T32, N2, M0.

- **T (tumor)** – Depth and spread of the main (primary) tumor(s) in one or both breasts
- **N (node)** – If cancer has spread to nearby (regional) lymph nodes
- **M (metastasis)** — If cancer has spread to distant parts of the body or metastasized

### T = Tumor

The primary tumor size can be measured in centimeters (cm) or millimeters (mm). One inch is equal to 2.54 cm. A large pea is 1 cm (10 mm). A golf ball is 4 cm (40 mm). A tumor micrometastasis is a very small collection of cancerous cells smaller than 1 mm. It might be written as T1mi. Ipsilateral means on the same side of the body.

- **T1** Tumor is 2 cm (20 mm) or less
- **T2** Tumor is 2.1 cm to 5 cm
- **T3** Tumor is more than 5 cm
- **T4** Tumor is of any size and has invaded nearby structures such as the chest wall and skin of the breast
  - **T4d** Tumor is inflammatory carcinoma (inflammatory breast cancer)

## N = Regional lymph node

Lymph, a clear fluid containing cells that help fight infections and other diseases, drains through channels into lymphatic vessels. From here, lymph drains into lymph nodes. There are hundreds of lymph nodes throughout your body. They work as filters to help fight infection and remove harmful things from your body. Regional lymph nodes are those located near the tumor in the breast. If breast cancer spreads, it often goes first to nearby lymph nodes under the arm. It can also sometimes spread to lymph nodes near the collarbone or near the breastbone. Knowing if the cancer has spread to your lymph nodes helps doctors find the best way to treat your cancer.

- **N0** means no cancer is in the regional lymph nodes. Isolated tumor cells (ITCs) may be present. These are malignant cell clusters no larger than 0.2 mm.
- **N1mi** means micrometastases (approximately 200 cells, larger than

0.2 mm, but not larger than 2.0 mm) are found in lymph nodes.

- **N1, N2, N3** means regional lymph node metastases are found. The higher the number, the more lymph nodes that have metastases.

## M = Metastasis

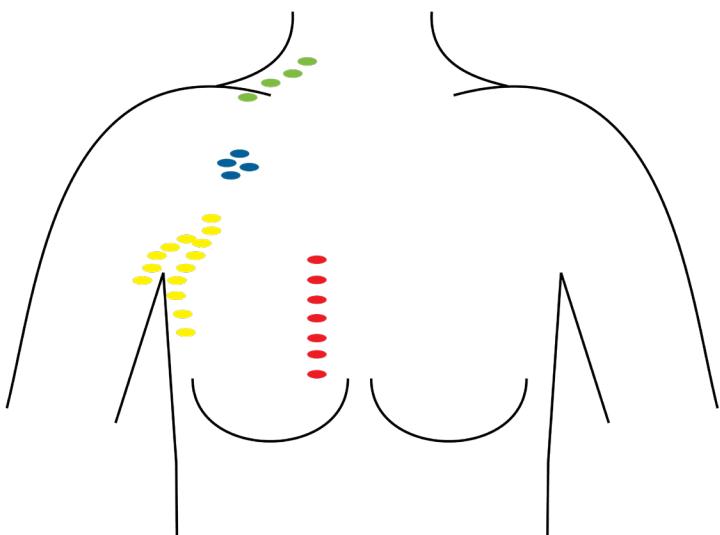
Cancer that has spread to distant parts of the body is shown as M1. This is metastatic breast cancer (MBC). The most common sites for metastasis are bone and lung.

- **M0** means no evidence of distant metastasis.
- **M1** means distant metastasis is found. This is metastatic breast cancer.

## Clinical staging

**Clinical staging of lymph nodes is staging before surgery.**

- **Cancer is in axillary nodes**
- **Cancer is in internal mammary nodes**
- **Cancer is in infraclavicular nodes**
- **Cancer is in supraclavicular nodes**



## Grade

Grade describes how abnormal the tumor cells look under a microscope (called histology). Higher-grade cancers tend to grow and spread faster than lower-grade cancers. GX means the grade can't be determined, followed by G1, G2, and G3. G3 is the highest grade for breast cancers. A low-grade tumor has a low risk of recurrence. A high-grade tumor has a higher risk of recurrence (of cancer returning).

- **GX** – Grade cannot be determined
- **G1** – Low
- **G2** – Intermediate
- **G3** – High

## Numbered stages

Numbered stages are based on TNM scores and receptor (hormone and HER2) status. Stages range from stage 0 to stage 4, with 4 being the most advanced. They might be written as stage 0, stage I, stage II, stage III, and stage IV.

### Stage 0 is noninvasive

Noninvasive breast cancer is rated stage 0. Ductal carcinoma in situ (DCIS) is found only in the ducts (Tis). It has not spread to the surrounding breast tissue, lymph nodes (N0) or distant sites (M0).

### Stages 1, 2, and 3 are invasive

Invasive breast cancer is rated stage 1, 2, or 3. It has grown outside the ducts, lobules, or breast skin. Cancer might be in the axillary lymph nodes.

### Stage 4 is metastatic

In stage 4 breast cancer, cancer has spread to distant sites. It can develop from earlier stages. Sometimes, the first diagnosis is stage 4 metastatic breast cancer (called de novo).

More information on metastatic breast cancer is available at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the [NCCN Patient Guides for Cancer app](https://www.nccn.org/patientguidelines/mobile-app).



## Key points

- Staging helps to predict prognosis and is needed to make treatment decisions. A prognosis is the course your cancer will likely take.
- The tumor, node, metastasis (TNM) system is used to stage breast cancer.
- Breast cancer is often staged twice, before and after surgery.
- Clinical stage (c) is the rating given before any treatment. It is written as cTNM.
- Pathologic stage (p) or surgical stage is determined by examining tissue removed during surgery. It is written as pTNM.
- Grade describes how abnormal the tumor cells look under a microscope (called histology).
- Regional lymph nodes are found near the breast.

Keep copies of your pathology reports. The pathology report might include a lot of abbreviations such as pNO(mo<sup>+</sup>), ypT2, or cN3. Ask your care team to explain what they mean.

# 4

## Treating IBC

33	Care team	39	Immunotherapy
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36	Radiation therapy	43	Clinical trials
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38	HER2-targeted therapy	49	Key points
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This chapter provides an overview of treatment options and what to expect. Together, you and your care team will choose a treatment plan that is best for you.

## Care team

Treating breast cancer takes a team approach. Treatment decisions should involve a multidisciplinary team (MDT). An MDT is a team of health care and psychosocial care professionals from different professional backgrounds who have knowledge (expertise) and experience in your type of cancer.

This team is united in the planning and implementing of your treatment. Ask who will coordinate your care.

Some members of your care team will be with you throughout cancer treatment, while others will only be there for parts of it. Get to know your care team and help them get to know you.

Depending on your diagnosis, the care team might include the following:

- **A diagnostic radiologist** interprets the results of mammograms, ultrasounds, and other imaging tests.
- **An interventional radiologist** performs needle biopsies and places intravenous (IV) ports for treatment.
- **A pathologist** analyzes the cells and tissues removed during a biopsy and provides cancer diagnosis, staging, and information about biomarker testing.

- **A surgical oncologist** performs operations to remove cancer.
- **A reconstructive (plastic) surgeon** performs breast reconstruction, if desired, for those who undergo mastectomy.
- **A medical oncologist** treats cancer in adults using systemic therapy.
- **A radiation oncologist** prescribes and delivers radiation therapy to treat cancer.
- **An anesthesiologist** gives anesthesia, a medicine so you do not feel pain during surgery or procedures.
- **Residents and fellows** are doctors who are continuing their training, some to become specialists in a certain field of medicine.
- **Nurse practitioners (NPs) and physician assistants (PAs)** are health care providers. Some of your clinic visits may be done by a nurse practitioner or physician assistant.
- **Oncology nurses** provide your hands-on care, like giving systemic therapy, managing your care, answering questions, and helping you cope with side effects.
- **Oncology pharmacists** are experts in knowing how to use medicines to treat cancer and to manage symptoms and side effects.
- **Palliative care nurses, advanced practice providers (APPs), and physicians** help provide an extra layer of support with cancer-related care.
- **Radiation therapists** provide your hands-on delivery of radiotherapy treatments.

- **Nutritionists and dietitians** can provide guidance on what foods are most suitable for your condition.
- **Psychologists and psychiatrists** are mental health experts who can help manage issues such as depression, anxiety, or other mental health conditions that can affect how you think and feel.
- **Social workers** help people solve and cope with problems in their everyday lives. Clinical social workers also diagnose and treat mental, behavioral, and emotional issues. The anxiety a person feels when diagnosed with cancer might be managed by a social worker in some cancer centers. They, or other designated professionals, can help navigate the complexities of financial and insurance stresses.
- **A research team** helps to collect research data and coordinate care if you are in a clinical trial. Clinical trials help bring new therapies to patients and advance the treatment for everyone. Consider asking your care team about access to clinical trials.

Your physical, mental, and emotional well-being are important. Help other team members understand:

- How you feel
- What you need
- What is working and what is not

Keep a list of names and contact information for each member of your team. This will make it easier for you and anyone involved in your care to know whom to contact with questions or concerns.

Get to know your care team and help them get to know you.

## Treatment overview

Inflammatory breast cancer is treatable. Treatment can be local, systemic, or usually a combination of both.

Local therapy focuses on the breast, chest wall, and lymph node area. It includes:

- Mastectomy (surgery)
- Radiation therapy

Systemic therapy works throughout the body. It includes:

- Chemotherapy
- HER2-targeted therapy
- Inhibitors
- Immunotherapy
- Endocrine therapy

For a list of systemic therapies, see **Guide 2**.

IBC is treated with systemic therapy to shrink the tumor, followed by surgery to remove the breast and lymph nodes, and then radiation therapy. Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue. Systemic treatment is based on estrogen receptor (ER), progesterone receptor (PR), and HER2 expression. It is important to have regular talks with your care team about your goals for treatment and your treatment plan.

There are many treatment options. However, not everyone will respond to treatment in the same way. Some people will do better than expected. Others will do worse. Many factors play a role in how the cancer will respond to treatment.

## Guide 2 Systemic therapy examples

### Chemotherapy examples

- Capecitabine (Xeloda)
- Carboplatin
- Cisplatin (Platinol)
- Cyclophosphamide
- Docetaxel (Taxotere)
- Doxorubicin (Adriamycin)
- Doxorubicin liposomal injection (Doxil)
- Epirubicin (Ellence)
- Eribulin (Halaven)
- Fluorouracil
- Methotrexate
- Paclitaxel (Taxol, Abraxane)
- Vinorelbine (Navelbine)

### Inhibitor (CDK4/6, mTOR, and PARP) examples

- Abemaciclib (Verzenio)
- Alpelisib (Piqray)
- Everolimus (Afinitor)
- Olaparib (Lynparza)
- Palbociclib (Ibrance)
- Ribociclib (Kisqali)
- Talazoparib (Talzenna)

### Immunotherapy example

- Pembrolizumab (Keytruda)

### HER2-targeted therapy (antibody, inhibitor, and conjugate) examples

- Pertuzumab (Perjeta)
- Trastuzumab (Herceptin) or trastuzumab substitutes (biosimilars) such as Kanjinti, Ogviri, Herzuma, Ontruzant, and Trazimera
- Ado-trastuzumab emtansine (T-DM1) (Kadcyla)
- Fam-trastuzumab deruxtecan-nxki (Enhertu)
- Lapatinib (Tykerb)
- Margetuximab-cmkb (Margenza)
- Neratinib (Nerlynx)
- Tucatinib (Tukysa)
- Phesgo as a substitute for combination therapy of trastuzumab with pertuzumab

## Mastectomy

Surgery is an operation or procedure to remove cancer from the body. A mastectomy removes all or part of the breast. Inflammatory breast cancer is often treated with a modified radical mastectomy. In a modified radical mastectomy, the breast and underarm (axilla) sentinel lymph nodes are removed. Before removing the breast, the surgeon may do a sentinel lymph node biopsy (SLNB). Sentinel lymph nodes are the first lymph nodes cancer cells are likely to have spread from the primary tumor.

Breast reconstruction is an option after a mastectomy. If you opt for reconstruction, it will be done after finishing cancer treatment. This is called delayed reconstruction. Breast reconstruction is often done in stages. You might want to consult with a plastic surgeon.

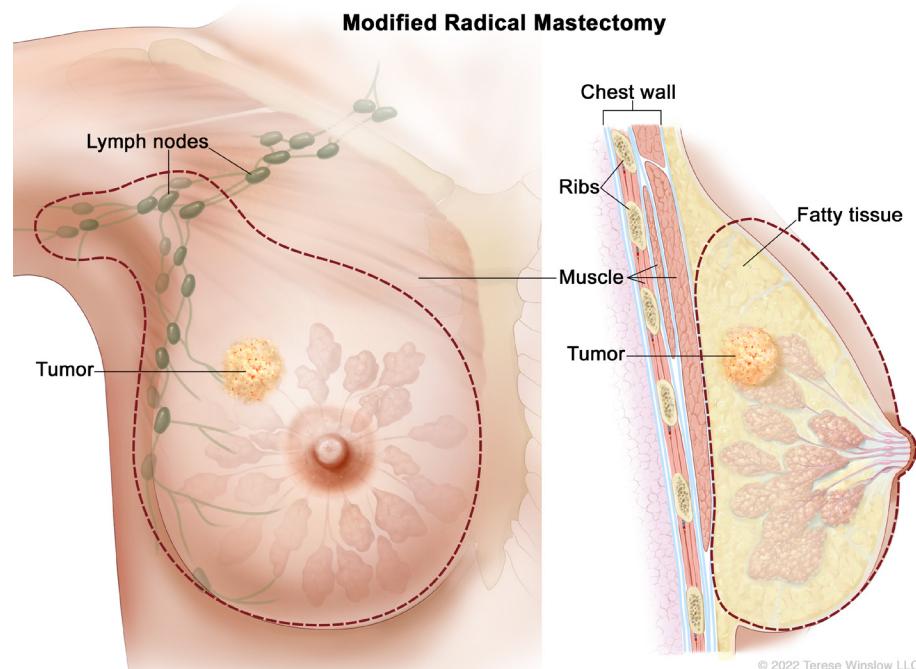
When preparing for surgery, seek the opinion of an experienced surgeon. The surgeon should be an expert in performing your type of surgery. Hospitals that perform many surgeries often have better results. You can ask for a referral to a hospital or cancer center that has experience in treating your type of cancer.

## Radiation therapy

Radiation therapy (RT) uses high-energy radiation from x-rays, photons, protons, and other sources to kill cancer cells and shrink tumors. Radiation therapy can be given alone or before or after surgery to treat or slow the growth of cancer. Sometimes, radiation is given with certain systemic therapies. It may be used as supportive care to help ease pain or discomfort caused by cancer. Most types of radiation include several short treatment

### Modified radical mastectomy

**The dotted line shows where the entire breast and some lymph nodes are removed. Part of the chest wall muscle may also be removed.**



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sessions that are given once daily over a few days to weeks. Ask your care team which radiation option(s) are best for you and what side effects to expect.

Radiation may be given to the chest wall, infraclavicular region (below the collarbone), supraclavicular area (above the collarbone), or lymph nodes found in the axillary bed (armpit). Lymph node radiation therapy is also called regional nodal irradiation (RNI).

### External beam radiation therapy

External beam radiation therapy (EBRT) uses a machine outside of the body called a linear accelerator (linac) to aim radiation at the whole breast (WBRT) and lymph nodes (RNI).

## Chemotherapy

Systemic therapy is drug therapy that works throughout the body. It is used before surgery to shrink the tumor or reduce the amount of cancer (called cancer burden).

- **Preoperative** is systemic (drug) treatment given before surgery. It is also called neoadjuvant therapy.
- **Postoperative** is systemic (drug) treatment given after surgery. It is also called adjuvant therapy.

Chemotherapy kills fast-dividing cells throughout the body, including cancer cells and some normal cells. More than one chemotherapy may be used to treat inflammatory breast cancer. When only one drug is used, it's called a single agent. A combination or multi-agent regimen is the use of two or more chemotherapy drugs.



### Warnings about supplements and drug interactions

You might be asked to stop taking or avoid certain herbal supplements when on a systemic therapy. Some supplements can affect the ability of a drug to do its job. This is called a drug interaction.

**It is critical to speak with your care team about any supplements you may be taking. Some examples include:**

- Turmeric
- Gingko biloba
- Green tea extract
- St. John's Wort
- Antioxidants

Certain medicines can also affect the ability of a drug to do its job. Antacids, heart or blood pressure medicine, and antidepressants are just some of the medicines that might interact with a systemic therapy. Therefore, it is very important to tell your care team about any medicines, vitamins, over-the-counter (OTC) drugs, herbals, or supplements you are taking.

**Bring a list with you to every visit.**

Some chemotherapy drugs are liquids that are infused into a vein or injected under the skin with a needle. Other chemotherapy drugs may be given as a pill that is swallowed.

Some examples of chemotherapy drugs include:

- Doxorubicin (Adriamycin), doxorubicin liposomal injection (Doxil), and epirubicin (Ellence) are **anthracyclines**.
- Docetaxel, paclitaxel, and albumin-bound paclitaxel are **taxanes**.
- Capecitabine (Xeloda), fluorouracil, gemcitabine (Gemzar, Infugem), and methotrexate are **antimetabolites**.

Most chemotherapy is given in cycles of treatment days followed by days of rest. This allows the body to recover before the next cycle. Cycles vary in length depending on which drugs are used. The number of treatment days per cycle and the total number of cycles given also vary.

## Myeloid growth factors

Certain chemotherapies can reduce the cells that fight infection. Treatments with myeloid growth factors (MGFs) can help increase the number of white blood cells and prevent infections.

More information on myeloid growth factors, can be found in the *NCCN Guidelines for Patients: Anemia and Neutropenia*, at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.

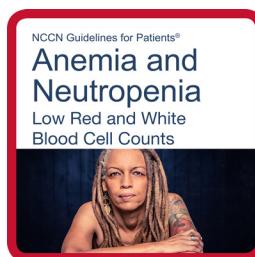
## HER2-targeted therapy

HER2 is a protein involved in normal cell growth. There might be higher amounts of HER2 in your breast cancer. If this is the case, it is called HER2-positive (HER2+) breast cancer. HER2-targeted therapy is drug therapy that treats HER2+ breast cancer. Most often, HER2-targeted therapy is given with chemotherapy. However, it might be used alone or in combination with endocrine therapy.

HER2-targeted therapies include:

- **HER2 antibodies** prevent growth signals from HER2 from outside the cell. They also increase the attack of immune cells on cancer cells.
- **HER2 inhibitors** stop growth signals from HER2 from within the cell.
- **HER2 conjugates or antibody drug conjugates (ADCs)** deliver cell-specific chemotherapy. They attach to HER2s then enter the cell. Once inside, chemotherapy is released.

Your heart will be monitored before and during treatment with trastuzumab. Tests will measure the left ventricular ejection fraction (LVEF), the amount of blood pumping from the left side of the heart.



## Inhibitors

This section is for inhibitors that are different from inhibitors used in HER2-targeted therapy.

### CDK4/6 inhibitors

Cyclin-dependent kinase (CDK) is a cell protein that helps cells grow and divide. For hormone receptor-positive (HR+), HER2- cancer, taking a CDK4/6 inhibitor with endocrine therapy may help control cancer longer. With all CDK4/6 regimens, those who are premenopausal must also receive ovarian ablation or suppression. CDK4/6 inhibitors include abemaciclib (Verzenio), palbociclib (Ibrance), and ribociclib (Kisqali).

### mTOR inhibitors

mTOR is a cell protein that helps cells grow and divide. Endocrine therapy may stop working if mTOR becomes overactive. mTOR inhibitors are used to get endocrine therapy working again.

Everolimus (Afinitor) is an mTOR inhibitor. Most often, it is taken with exemestane. For some, it may be taken with fulvestrant or tamoxifen.

### PARP inhibitors

Cancer cells often become damaged. PARP is a cell protein that repairs cancer cells and allows them to survive. Blocking PARP can cause cancer cells to die. Olaparib (Lynparza) and talazoparib (Talzenna) are PARP inhibitors. You must have the *BRCA1* or *BRCA2* mutation and your breast cancer must be HER2- for PARP inhibitors to be considered.

### Did you know?

The terms “chemotherapy” and “systemic therapy” are often used interchangeably, but they are not the same. Systemic therapy works throughout the body and includes chemotherapy, targeted therapy, immunotherapy, endocrine therapy, and others.

### PIK3CA inhibitor

The *PIK3CA* gene is one of the most frequently mutated genes in breast cancers. A mutation in this gene can lead to increased growth of cancer cells and resistance to various treatments. Alpelisib (Piqray) is an example of a PIK3CA inhibitor.

## Immunotherapy

Immunotherapy is a type of systemic treatment that tries to re-activate the immune system against tumor cells. The immune system has many on and off switches. Tumors take advantage of "off switches." Two leading off switches are PD-1 and CTLA4. Immunotherapy can be given alone or with other types of treatment. An immunotherapy example is pembrolizumab (Keytruda).

## Endocrine therapy

Endocrine therapy blocks estrogen or progesterone to treat hormone receptor-positive (HR+) breast cancer. The endocrine system is made up of organs and tissues that produce hormones. Hormones are natural chemicals released into the bloodstream.

There are 4 hormones that might be targeted in endocrine therapy:

- **Estrogen** is made mainly by the ovaries, and also by other tissues in the body such as the fat tissue.
- **Progesterone** is made mainly by the ovaries.
- **Luteinizing hormone-releasing hormone (LHRH)** is made by a part of the brain called the hypothalamus. It tells the ovaries to make estrogen and progesterone and testicles to make testosterone. LHRH is also called gonadotropin-releasing hormone (GnRH).
- **Androgen** is made by the adrenal glands, testicles, and ovaries.

Hormones may cause breast cancer to grow. Endocrine therapy will stop your body from making hormones or it will block what hormones do in the body. This can slow tumor growth or shrink the tumor for a period of time.

Endocrine therapy is sometimes called hormone therapy. It is not the same as hormone replacement therapy used for menopause.

There is one type of surgical endocrine therapy:

- **Bilateral oophorectomy** is surgery to remove both ovaries.

Other main types of endocrine therapy include:

- **Ovarian ablation** uses radiation to permanently stop the ovaries from making hormones.
- **Ovarian suppression** uses drugs to temporarily stop the ovaries from making hormones. It is achieved with drugs called LHRH agonists. These drugs stop LHRH from being made, which stops the ovaries from making hormones. LHRH agonists include goserelin (Zoladex) and leuprolide (Lupron Depot). Gonadotropin-releasing hormone (GnRH) agonists might be used to suppress ovarian hormone or testosterone production.
- **Aromatase inhibitors (AIs)** stop a type of hormone called androgen from changing into estrogen by interfering with an enzyme called aromatase. They do not affect estrogen made by the ovaries. Non-steroidal aromatase inhibitors include anastrozole (Arimidex) and letrozole (Femara). Exemestane (Aromasin) is a steroidal aromatase inhibitor.
- **Estrogen receptor (ER) modulators** or anti-estrogens prevent hormones from binding to receptors. SERMs and SERDs are types of ER modulators.
  - **Selective estrogen receptor modulators (SERMs)** block estrogen from attaching to hormone receptors. They include tamoxifen and toremifene (Fareston).
  - **Selective estrogen receptor degraders (SERDs)** block and destroy estrogen receptors. Fulvestrant (Faslodex) and elacestrant (Orserdu) are SERDs.

- **Gonadotropin-releasing hormone (GnRH) agonists** might be used to suppress ovarian hormone or testosterone production.
- **Hormones** may be used to treat breast cancer when taken in high doses. It is not known how hormones stop breast cancer from growing. They include ethinyl estradiol, fluoxymesterone, and megestrol acetate (Megace ES).

Those who want to have children in the future should be referred to a fertility specialist before starting endocrine therapy to discuss the options.

## Testosterone

For those assigned male at birth whose bodies continue to make testosterone, endocrine therapy includes tamoxifen or an aromatase inhibitor with testosterone-suppressing therapy.

## Premenopause

If you have menstrual periods, you are in premenopause. In premenopause, the ovaries are the main source of estrogen and progesterone. Menstrual periods may stop during treatment (called amenorrhea) and for up to 2 years after treatment, but often return in those 35 years of age and under.

## Endocrine therapy

<b>Bilateral oophorectomy</b>	Surgery to remove both ovaries.
<b>Ovarian ablation</b>	Radiation to permanently stop the ovaries from making hormones.
<b>Ovarian or testosterone suppression</b>	Drugs to temporarily stop the ovaries or testicles from making hormones such as LHRH and GnRH agonists.
<b>Aromatase inhibitors (AIs)</b>	Drugs to stop a type of hormone called androgen from changing into estrogen by interfering with an enzyme called aromatase.
<b>Estrogen receptor (ER) modulators</b>	<ul style="list-style-type: none"> <li>• Selective estrogen receptor modulators (SERMs) block estrogen from attaching to hormone receptors. Tamoxifen and toremifene (Fareston) are SERMs.</li> <li>• Selective estrogen receptor degraders (SERDs) block and destroy estrogen receptors. Fulvestrant (Faslodex) and elacestrant (Orserdu) are SERDs.</li> </ul>
<b>Hormones</b>	It is not known how hormones stop breast cancer from growing. They include ethinyl estradiol, fluoxymesterone, and megestrol acetate (Megace ES).

Tamoxifen is the endocrine treatment for those in premenopause. Ovarian suppression or ablation is frequently considered for higher risk ER+ breast cancers.

## Menopause

In menopause, the ovaries permanently stop producing hormones and menstrual periods stop. Estrogen and progesterone levels are low, but, the adrenal glands, liver, and body fat continue to make small amounts of estrogen. If you don't have periods, a test using a blood sample may be used to confirm your status.

Cancer treatment can cause a temporary menopause.

Tamoxifen is the endocrine treatment for those in premenopause. GnRH agonists may be used to temporarily induce menopause for those in premenopause. Combination of GnRH agonists and tamoxifen/aromatase inhibitors may be considered as endocrine therapy for those in premenopause. Ovarian suppression

or ablation is frequently considered for higher risk ER+ breast cancers.

## Bone-strengthening therapy

Medicines that target the bones may be given to help relieve bone pain or reduce the risk of bone problems. Some medicines work by slowing or stopping bone breakdown, while others help increase bone thickness.

When breast cancer spreads to distant sites, it may metastasize in your bones. This puts your bones at risk for injury and disease. Such problems include bone loss (osteoporosis), fractures, bone pain, and squeezing (compression) of the spinal cord. Some treatments for breast cancer, like aromatase inhibitors or GnRH agonists, can cause bone loss, which put you at an increased risk for fractures.

**"My 3-month-old son stopped nursing on my left breast and it was swollen and painful. The doctor said it was mastitis, but this didn't feel the same as when I'd had that before. Even with the antibiotic, it didn't improve. An ultrasound showed a questionable area in that breast and a biopsy confirmed inflammatory breast cancer (IBC)."**



Drugs used to prevent bone loss and fractures:

- Oral bisphosphonates
- Zoledronic acid (Zometa)
- Pamidronate (Aredia)
- Denosumab (Prolia)

Drugs used to treat bone metastases:

- Zoledronic acid (Zometa)
- Pamidronate (Aredia)
- Denosumab (Xgeva)

You will be screened for bone weakness (osteoporosis) using a bone mineral density test. This measures how much calcium and other minerals are in your bones. It is also called a dual-energy x-ray absorptiometry (DEXA) scan and is painless. Bone mineral density tests look for osteoporosis and help predict your risk for bone fractures.

A baseline DEXA scan is recommended before starting endocrine therapy.

## Zoledronic acid, pamidronate, and denosumab

Zoledronic acid, pamidronate, and denosumab are used to prevent bone loss (osteoporosis) and fractures. Zoledronic acid and denosumab are also used in those with metastatic breast cancer who have bone metastases to help reduce the likelihood of fractures, pain, or other complications arising from cancer in bone. You might have blood tests to monitor kidney function, calcium levels, and magnesium levels. A calcium and vitamin D supplement will be recommended by your doctor.

Let your dentist know if you are taking any of these medicines. Also, ask your care team

how these medicines might affect your teeth and jaw. Osteonecrosis, or bone tissue death of the jaw, is a rare but serious side effect. Tell your care team about any planned trips to the dentist and surgeries or dental procedures that might also affect the jaw bone. It will be important to take care of your teeth and to see a dentist before starting treatment with any of these drugs.

## Clinical trials

A clinical trial is a type of medical research study. After being developed and tested in a laboratory, potential new ways of treating cancer need to be studied in people. If found to be safe and effective in a clinical trial, a drug, device, or treatment approach may be approved by the U.S. Food and Drug Administration (FDA).

Everyone with cancer should carefully consider all of the treatment options available for their cancer type, including standard treatments and clinical trials. Talk to your doctor about whether a clinical trial may make sense for you.

## Phases

Most cancer clinical trials focus on treatment. Treatment trials are done in phases.

- **Phase I trials** study the dose, safety, and side effects of an investigational drug or treatment approach. They also look for early signs that the drug or approach is helpful.
- **Phase II trials** study how well the drug or approach works against a specific type of cancer.
- **Phase III trials** test the drug or approach against a standard treatment. If

the results are good, it may be approved by the FDA.

- **Phase IV trials** study the long-term safety and benefit of an FDA-approved treatment.

## Who can enroll?

Every clinical trial has rules for joining, called eligibility criteria. The rules may be about age, cancer type and stage, treatment history, or general health. These requirements ensure that participants are alike in specific ways and that the trial is as safe as possible for the participants.

## Informed consent

Clinical trials are managed by a group of experts called a research team. The research team will review the study with you in detail, including its purpose and the risks and benefits of joining. All of this information is also provided in an informed consent form. Read the form carefully and ask questions before signing it. Take time to discuss with family, friends, or others whom you trust. Keep in mind that you can leave and seek treatment outside of the clinical trial at any time.

## Start the conversation

Don't wait for your doctor to bring up clinical trials. Start the conversation and learn about all of your treatment options. If you find a study that you may be eligible for, ask your treatment team if you meet the requirements. If you have already started standard treatment you may not be eligible for certain clinical trials. Try not to be discouraged if you cannot join. New clinical trials are always becoming available.



## Finding a clinical trial

### In the United States

**NCCN Cancer Centers**  
[NCCN.org/cancercenters](https://www.nccn.org/cancercenters)

**The National Cancer Institute (NCI)**  
[cancer.gov/about-cancer/treatment/clinical-trials/search](https://cancer.gov/about-cancer/treatment/clinical-trials/search)

### Worldwide

**The U.S. National Library of Medicine (NLM)**  
[clinicaltrials.gov/](https://clinicaltrials.gov/)

## Need help finding a clinical trial?

**NCI's Cancer Information Service (CIS)**  
1.800.4.CANCER (1.800.422.6237)  
[cancer.gov/contact](https://cancer.gov/contact)

## Frequently asked questions

There are many myths and misconceptions surrounding clinical trials. The possible benefits and risks are not well understood by many with cancer.

### Will I get a placebo?

Placebos (inactive versions of real medicines) are almost never used alone in cancer clinical trials. It is common to receive either a placebo with a standard treatment, or a new drug with a standard treatment. You will be informed, verbally and in writing, if a placebo is part of a clinical trial before you enroll.

### Do I have to pay to be in a clinical trial?

Rarely. It depends on the study, your health insurance, and the state in which you live. In general, procedures, drugs, or tests that are considered standard of care will be billed to you or your insurance, whereas those considered research are covered by the trial sponsor. Your treatment team and the research team can help determine if you are responsible for any costs.

## Supportive care

Supportive care will be specific to your needs. Supportive care is health care given to prevent, reduce, and relieve suffering, and to improve quality of life. Supportive care might include pain relief, palliative care, emotional or spiritual support, financial aid, or family counseling. Tell your care team how you are feeling and about any side effects so they can be managed. Best supportive care, supportive care, and palliative care are often used interchangeably.

It is very important to take care of yourself by eating well, drinking plenty of fluids, exercising, and doing things that make you feel energized.

It is important to tell your care team about all side effects so they can be managed.

Strength is needed to sustain you during treatment.

### Side effects

All cancer treatments can cause unwanted health issues called side effects. Side effects depend on many factors. These factors include the drug type and dose, length of treatment, and the person. Some side effects may be harmful to your health. Others may just be unpleasant. Treatment can cause several side effects. Some are very serious.

Ask for a complete list of side effects of your treatments. Also, tell your treatment team about any new or worsening symptoms. There may be ways to help you feel better. There are also ways to prevent some side effects. You will be monitored closely for side effects.

### Late effects

Late effects are side effects that occur months or years after a disease is diagnosed or after treatment has ended. Late effects may be caused by cancer or cancer treatment. They may include physical, mental, and social problems, and second cancers. The sooner

late effects are treated the better. Ask your care team about what late effects could occur. This will help you know what to look for.

## **Survivorship**

A person is a cancer survivor from the time of diagnosis until the end of life. When treatment leads to remission (or no evidence of disease), you will need follow-up or survivorship care for late effects. During survivorship care you will still have a care team, but it will look different. Seek out peer support groups, whether online or in-person.

# **Side effects**

## **Blood clots**

Cancer or cancer treatment can cause blood clots to form. This can block blood flow and oxygen in the body. Blood clots can break loose and travel to other parts of the body causing stroke or other health issues. Venous thromboembolism (VTE) refers to blood clots in the veins.

**More information on supportive care is available at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the [NCCN Patient Guides for Cancer app](#).**

## **Bone health**

Breast cancer may spread to your bones. Some breast cancer treatments may also weaken your bones. Both can put your bones at increased risk for injury and disease. Such problems include bone fractures, bone pain, and squeezing (compression) of the spinal cord. High levels of calcium in the blood, called hypercalcemia, may also occur.

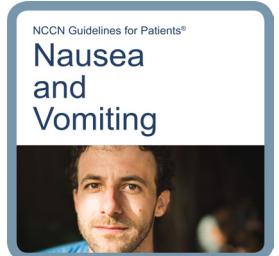
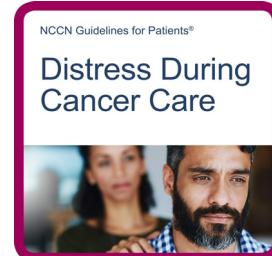
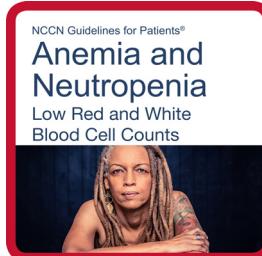
Medicine may be given to help relieve bone pain and reduce the risk of other bone problems. Some medicines work by slowing or stopping bone breakdown, while others help increase bone thickness. It is recommended that you take calcium and vitamin D with these bone health medicines. Talk to your doctor first.

## **Diarrhea**

Diarrhea is frequent and watery bowel movements. Your care team will tell you how to manage diarrhea. It is important to drink lots of fluids.

## **Difficulty eating**

Sometimes side effects from surgery, cancer, or its treatment might cause you to feel not hungry or sick to your stomach (nauseated). You might have a sore mouth. Healthy eating



is important during treatment. It includes eating a balanced diet, eating the right amount of food, and drinking enough fluids. A registered dietitian who is an expert in nutrition and food can help. Speak to your care team if you have trouble eating or maintaining weight.

## Distress

Depression, anxiety, and sleeping issues are common and are a normal part of cancer diagnosis. Talk to your care team and with those whom you feel most comfortable about how you are feeling. There are services, people, and medicine that can help you. Support and counseling services are available.

## Fatigue

Fatigue is extreme tiredness and inability to function due to lack of energy. Fatigue may be caused by cancer or it may be a side effect of treatment. Let your care team know how you are feeling and if fatigue is getting in the way of doing the things you enjoy. Eating a balanced diet, exercise, yoga, acupuncture, and massage therapy can help. You might be referred to a nutritionist or dietitian to help with fatigue.

## Hair loss

Chemotherapy may cause hair loss (alopecia) all over your body — not just on your scalp. Some chemotherapy drugs are more likely than others to cause hair loss. Dosage might also affect the amount of hair loss. Most of the time, hair loss from chemotherapy is temporary. Hair often regrows 3 to 6 months after treatment ends. Your hair may be a different shade or texture. Scalp cooling (or scalp hypothermia) might help lessen hair loss in those receiving certain types of chemotherapy.

## Keep a pain diary

A pain diary is a written record that helps you keep track of when you have pain, how bad it is, what causes it, and what makes it better or worse. Use a pain diary to discuss your pain with your care team. You might be referred to a specialist for pain management.

Include in your pain diary:

- ✓ The time and dose of all medicines
- ✓ When pain starts and ends or lessens
- ✓ Where you feel pain
- ✓ A description of your pain. Is it throbbing, sharp, tingling, shooting, or burning? Is it constant, or does it come and go?
- ✓ Does the pain change at different times of day? When?
- ✓ Does the pain get worse before or after meals? Does certain food or drink make it better?
- ✓ Does the pain get better or worse with activity? What kind of activity?
- ✓ Does the pain keep you from falling asleep at night? Does pain wake you up in the night?
- ✓ A rating of your pain from 0 (no pain) to 10 (worst pain you have ever felt)
- ✓ Does pain get in the way of you doing the things you enjoy?

## Low blood cell counts

Some cancer treatments can cause low blood cell counts.

- **Anemia** is a condition where your body does not have enough healthy blood cells, resulting in less oxygen being carried to your cells. You might tire easily if you are anemic.
- **Neutropenia** is a decrease in neutrophils, a type of white blood cell. This puts you at risk for infection.
- **Thrombocytopenia** is a condition where there are not enough platelets found in the blood. This puts you at risk for bleeding.

## Lymphedema

Lymphedema is a condition in which extra lymph fluid builds up in tissues and causes swelling (edema). It may occur when part of the lymph system is damaged or blocked, such as during surgery to remove lymph nodes or due to radiation therapy. Swelling usually develops slowly over time. It may develop during treatment or it may start years after treatment. If you have lymphedema, you may be referred to an expert in lymphedema management. The swelling may be reduced by exercise, massage, compression sleeves, and other means. Ask your care team about the ways to treat lymphedema.

## Nausea and vomiting

Nausea and vomiting are common side effects of treatment. You will be given medicine to prevent nausea and vomiting.

## Neurocognitive or neuropsychological effects

Some treatments can damage the nervous system (neurotoxicity) causing problems with concentration, memory, and thinking. Survivors are at risk for neurotoxicity and might be recommended for neuropsychological testing. Neuropsychology looks at how the health of your brain affects your thinking and behavior. Neuropsychological testing can identify your limits and a health care professional can create a plan to help with these limits.

## Neuropathy

Neuropathy is a nerve problem that causes pain, numbness, tingling, swelling, or muscle weakness in different parts of the body. It usually begins in the hands or feet and gets worse over time. Neuropathy may be caused by cancer or cancer treatment. Most of the time, neuropathy goes away after treatment.

## Organ issues

Treatment might cause your kidneys, liver, heart, and pancreas to not work as well as they should.

## Pain

Tell your care team about any pain or discomfort. You might meet with a palliative care specialist or with a pain specialist to manage pain.

## Key points

- Treatment takes a team approach. Get to know your care team and help them get to know you.
- IBC is treated with systemic therapy to shrink the tumor, followed by a mastectomy, and radiation therapy. Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue. Systemic treatment is based on estrogen receptor (ER), progesterone receptor (PR), and HER2 expression.
- Radiation therapy (RT) uses high-energy radiation from x-rays (photons, electrons), protons, and other sources to kill cancer cells.
- Some breast cancers grow because of estrogen. These cancers are estrogen receptor-positive (ER+) and are often treated with endocrine therapy to reduce the risk of cancer recurrence.
- A clinical trial is a type of research that studies a treatment to see how safe it is and how well it works.
- Supportive care is health care that relieves symptoms caused by treatment and improves quality of life. Supportive care is always given.
- All cancer treatments can cause unwanted health issues called side effects. It is important for you to tell your care team about all your side effects so they can be managed.
- Eating a balanced diet, drinking enough fluids, exercise, yoga, and massage therapy can help manage side effects.



### Let us know what you think!

Please take a moment to complete an online survey about the NCCN Guidelines for Patients.

[NCCN.org/patients/response](https://www.NCCN.org/patients/response)

# 5

## Your treatment options

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- 57 Key points

Since IBC spreads quickly, treatment starts with systemic therapy to stop the spread of cancer. Together, you and your care team will choose a treatment plan that is best for you.

## Overview

Since IBC spreads quickly, treatment starts with systemic therapy to stop the spread of cancer. If the cancer responds to treatment, then surgery is performed to remove the breast and lymph nodes (modified radical mastectomy) for those assigned female at birth with stage 3 cancer. This is followed by radiation to the chest wall. If you choose breast reconstruction after a mastectomy with radiation, then delayed breast reconstruction is recommended. Radiation can slow the healing process. Therefore, delayed reconstruction is recommended after all the healing from radiation is done.

Like other breast cancers, IBC can develop in those assigned male at birth.

Treatment for IBC starts with preoperative systemic therapy. Preoperative therapy is treatment given before surgery. It is based on the expression of estrogen receptor (ER) and HER2 in your tumor cells. Cancer can still progress during preoperative systemic therapy.

## Order of treatments

Most people with cancer will receive more than one type of treatment. Below is an overview of the order of treatments.

- ✓ **Preoperative or neoadjuvant (before) therapy** is given to shrink the tumor before a primary treatment such as surgery.
- ✓ **Perioperative therapy** is systemic therapy, such as chemotherapy, given before and after surgery.
- ✓ **Primary treatment** is the main treatment given to rid the body of cancer.
- ✓ **Postoperative or adjuvant (after) therapy** is given after primary treatment to rid the body of any cancer cells left behind from surgery. It is also used when the risk of cancer returning (recurrence) is felt to be high.
- ✓ **First-line therapy** is the first set of systemic (drug) treatment given.
- ✓ **Second-line therapy** is the next set of treatment given if cancer progresses during or after systemic therapy.

Talk to your care team about your treatment plan and what it means for your stage and type of cancer.

## HER2-

Chemotherapy is used to treat HER- cancer.

It might include another systemic therapy.

Systemic therapy options for HER2- can be found in **Guide 3**.

### Guide 3

#### Systemic therapy options: HER2-

##### Preferred options

- Doxorubicin and cyclophosphamide (AC) with paclitaxel
  - Docetaxel and cyclophosphamide (TC)
  - Olaparib, if germline *BRCA1* or *BRCA2* mutations
- 
- High-risk triple-negative breast cancer (TNBC): Preoperative pembrolizumab with carboplatin and paclitaxel, followed by preoperative pembrolizumab and cyclophosphamide with doxorubicin or epirubicin, followed by adjuvant pembrolizumab
  - If TNBC and residual disease after preoperative therapy with taxane-, alkylator-, and anthracycline-based chemotherapy, then capecitabine

##### Other recommended

- Doxorubicin and cyclophosphamide (AC) with docetaxel
  - Epirubicin and cyclophosphamide (EC)
  - Docetaxel, doxorubicin, and cyclophosphamide (TAC)
- 

Only in certain TNBC cases:

- Paclitaxel with carboplatin
  - Docetaxel with carboplatin (preoperative only)
- 

##### Used in some cases

- Doxorubicin and cyclophosphamide (AC)
- Cyclophosphamide, methotrexate, and fluorouracil (CMF)
- Doxorubicin and cyclophosphamide (AC) with paclitaxel
- Capecitabine (maintenance therapy for TNBC after adjuvant chemotherapy)

## HER2+

IBCs often produce greater than normal amounts of HER2. If the tumor is HER2+, then HER2-targeted therapy should be given as

preoperative systemic therapy. Systemic therapy options for HER2+ can be found in **Guide 4**.

### Guide 4

#### HER2-targeted therapy options: HER2+

<b>Preferred options</b>	<ul style="list-style-type: none"> <li>• Paclitaxel and trastuzumab</li> <li>• Docetaxel, carboplatin, and trastuzumab (TCH)</li> <li>• Docetaxel, carboplatin, trastuzumab, and pertuzumab (TCHP)</li> </ul> <p>If no residual disease after preoperative therapy or no preoperative therapy:</p> <ul style="list-style-type: none"> <li>• Complete up to 1 year of HER2-targeted therapy with trastuzumab. Pertuzumab might be added.</li> </ul> <p>If residual disease after preoperative therapy:</p> <ul style="list-style-type: none"> <li>• Ado-trastuzumab emtansine alone. If ado-trastuzumab emtansine discontinued for toxicity, then trastuzumab with or without pertuzumab to complete one year of therapy.</li> <li>• If node positive at initial staging, trastuzumab with pertuzumab</li> </ul>
<b>Other recommended</b>	<ul style="list-style-type: none"> <li>• Doxorubicin with cyclophosphamide followed by docetaxel with trastuzumab</li> <li>• Doxorubicin with cyclophosphamide followed by docetaxel with trastuzumab and pertuzumab</li> </ul>
<b>Used in some cases</b>	<ul style="list-style-type: none"> <li>• Docetaxel, cyclophosphamide, and trastuzumab</li> <li>• Doxorubicin and cyclophosphamide followed by paclitaxel with trastuzumab</li> <li>• Doxorubicin and cyclophosphamide followed by docetaxel with paclitaxel, trastuzumab, and pertuzumab</li> <li>• Neratinib (in adjuvant setting only)</li> <li>• Paclitaxel with trastuzumab and pertuzumab</li> <li>• Ado-trastuzumab emtansine (TDM-1) (in adjuvant setting only)</li> </ul>
<b>Notes</b>	<ul style="list-style-type: none"> <li>• Alternative taxanes (ie, docetaxel, paclitaxel, albumin-bound paclitaxel) might be substituted in some cases</li> <li>• An FDA-approved biosimilar or substitute might be used for trastuzumab.</li> </ul>

## Treatment response

The next treatment is based on how the tumor responded to preoperative systemic therapy. It is called preoperative (before surgery) treatment because the goal is surgery, when

possible. Systemic therapy given after surgery is called adjuvant therapy. Adjuvant systemic therapy may be given after surgery to reduce the chance of cancer recurrence.

### Guide 5 Endocrine therapy options

#### Premenopause at diagnosis

##### Option 1

- Tamoxifen alone or with ovarian suppression or ablation for 5 years



- After 5 years, if in postmenopause, then an aromatase inhibitor for 5 years or consider tamoxifen for another 5 years (for a total of 10 years on tamoxifen)
- After 5 years, if still in premenopause, then consider tamoxifen for another 5 years (for a total of 10 years on tamoxifen) or stop endocrine therapy

##### Option 2

- Aromatase inhibitor for 5 years with ovarian suppression or ablation, then consider aromatase inhibitor for an additional 3 to 5 years

#### Menopause at diagnosis

##### Option 1

- Aromatase inhibitor for 5 years, then consider aromatase inhibitor for 3 to 5 more years
- Aromatase inhibitor for 2 to 3 years, then tamoxifen to complete 5 years total of endocrine therapy
- Tamoxifen for 2 to 3 years, then an aromatase inhibitor to complete 5 years of endocrine therapy
- Tamoxifen for 2 to 3 years, then up to 5 years of an aromatase inhibitor

##### Option 2

- Tamoxifen for 4.5 to 6 years, then an aromatase inhibitor for 5 years or consider tamoxifen for another 5 years (for a total of 10 years on tamoxifen)

##### Option 3

- For those who can't have aromatase inhibitors or who don't want aromatase inhibitors, take tamoxifen for 5 years or consider tamoxifen for up to 10 years

A physical exam and imaging tests should be done to assess how the cancer responded to preoperative systemic therapy. Treatment will be based on if the tumor can be removed with surgery or if the tumor did not shrink enough to be removed with surgery.

### Surgery is an option

If surgery is possible, then a total mastectomy with level I and II axillary lymph node dissection is the recommended option. Because IBC usually involves a substantial portion of the breast, lumpectomy is not typically an option. You may choose a delayed breast reconstruction as part of the mastectomy. Radiation therapy (RT) is part of this treatment.

After the mastectomy and RT, you will finish chemotherapy if you didn't complete the course before surgery. If the tumor is ER+ and/or PR+, then you will have endocrine therapy. Endocrine therapy is used to treat tumors that are estrogen receptor-positive (ER+) and/or progesterone receptor-positive (PR+).

If the tumor is HER2+, then you will complete up to one year of HER2-targeted therapy. This may be given with RT and endocrine therapy.

For a list of systemic therapies that target HER2+, **see Guide 4**.

For a list of adjuvant endocrine therapy options, **see Guide 5**.

Supportive care aims to prevent, reduce, and relieve side effects and to improve quality of life.

### Surgery is not an option

Surgery is not always possible. Even though surgery might not be an option, systemic therapy will continue. If the cancer is not responding to systemic therapy, then radiation may be considered to try to make the cancer resectable (able to be removed with surgery). The goal of treatment is to reduce the amount of cancer. Talk with your care team about your goals of treatment and your treatment preferences. Your wishes are always important.

For a list of systemic therapies for HER2+ cancer, **see Guide 3**.

For a list of systemic therapies that target HER2+ cancer, **see Guide 4**.

## Follow-up care

After treatment, you will receive follow-up care. During this time, your health will be monitored for side effects of treatment called late effects and the possible return of cancer called recurrence. This is part of your survivorship care plan. It is important to keep any follow-up doctor visits and imaging test appointments. Seek routine medical care, including regular doctor visits for preventive care and cancer screening.

Tell your care team about any symptoms such as headaches, menstrual spotting between periods or new onset of spotting after

menopause (if prior tamoxifen use), shortness of breath that you notice with walking, or bone pain. Side effects can be managed. Continue to take all medicine such as endocrine therapy exactly as prescribed and do not miss or skip doses.

You should receive a personalized survivorship care plan. It will provide a summary of possible long-term effects of treatment and list follow-up tests. Find out how your primary care provider will coordinate with specialists for your follow-up care.

Follow-up care can be found in **Guide 6**.

### Guide 6 Follow-up care

Medical history and physical exam (H&P) 1 to 4 times per year as needed for 5 years, then every year

Screen for changes in family history

Genetic testing and referral to genetic counseling, as needed

Monitor for lymphedema and refer for lymphedema management, as needed

Mammogram every 12 months (not needed after mastectomy or on reconstructed breast)

Heart tests, as needed

Information on risk of future health issues (comorbidities)

If signs and symptoms of metastases, then blood and imaging tests

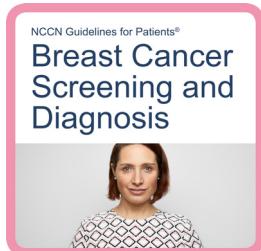
If taking endocrine therapy, continue to take endocrine therapy. Do not miss or skip doses

Annual gynecology exam for those on tamoxifen

Bone density tests for those on an aromatase inhibitor or who later have ovarian failure

Maintain an ideal body weight (BMI of 20 to 25), be active, eat a mostly plant-based diet, exercise, limit alcohol, and quit smoking/vaping nicotine

More information on breast cancer screening can be found at [NCCN.org/patientguidelines](https://www.NCCN.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.



- In triple-negative breast cancer (TNBC), receptors for estrogen, progesterone, and HER2 are not found. It is almost always treated with chemotherapy.
- It is important to keep follow-up visits and imaging test appointments. Seek good routine medical care, including preventative care and cancer screenings. Continue to take all medicines as prescribed.

## Key points

- Since IBC spreads quickly, treatment starts with systemic therapy to stop the spread of cancer. Surgery often follows.
- Treatment after surgery is called adjuvant treatment. It often includes systemic therapy and radiation therapy. It is given after surgery to kill any remaining cancer cells in the body and to help prevent the return of cancer.
- Adjuvant treatment is based on the stage, histology, and hormone receptor status. Histology is the study of the anatomy (structure) of cells, tissues, and organs under a microscope.
- In hormone receptor-positive (HR+) cancer, estrogen (ER+) and/or progesterone receptors (PR+) are found.
- Endocrine therapy is used to treat HR+ cancer.
- If chemotherapy is given, it is given before radiation therapy and endocrine therapy.

**share with us.**

Take our survey,  
and help make the  
**NCCN Guidelines for Patients**  
better for everyone!

[NCCN.org/patients/comments](https://www.NCCN.org/patients/comments)

# 6

## The breast after surgery

- 59 Flat closure
- 60 Breast reconstruction
- 60 Nipple replacement
- 61 What to consider
- 62 Key points

**The look of your breast after mastectomy will depend on factors such as your body type, age, and size and shape of the area before surgery. This chapter offers more information on flat closure and breast reconstruction.**

The recovery time for each procedure differs. This can affect your ability to return to work or participate in activities. You might consider speaking with a plastic surgeon before surgery to discuss your options and what to expect. If breast construction is something you might want, delayed reconstruction is recommended in those with IBC.

**Your preferences about treatment are always important. Talk to your care team and make your wishes known.**

## Flat closure

In a total mastectomy with a flat closure, the entire breast, including nipple, extra skin, fat, and other tissue in the breast area are removed. The remaining skin is tightened and sewn together. No breast mound is created and no implant is added. The scar will be slightly raised and differ in color than the surrounding skin. A flat closure is not completely flat or smooth. The end result varies from person to person. Ask to look at “after” pictures from flat closures so you know what to expect.

You might decide to have a flat closure procedure at a later time or after having breast implants removed. Talk to your care team to learn more.



## Breast reconstruction

Breast reconstruction is surgery to rebuild the shape and look of the breast after a mastectomy. In many cases, breast reconstruction involves a staged approach. It might require more than one procedure. If breast construction is something you might want, delayed reconstruction is recommended in those with IBC. Delayed reconstruction can occur months or years after mastectomy. A plastic surgeon performs breast reconstruction.

Breasts can be reconstructed with implants and flaps. All methods are generally safe, but as with any surgery, there are risks. Ask your treatment team for a complete list of side effects.

### Implants

Breast implants are small bags filled with salt water, silicone gel, or both. They are placed under the breast skin or muscle to look like a new breast following a mastectomy. A balloon-like device, called an expander, may be used first to stretch out tissue. It will be placed under your skin or muscle and enlarged every few weeks for two to three months. When your skin is stretched to the proper size, you will have surgery to place the final implant.

Implants have a small risk of leaking or causing other issues. You may feel pain from the implant or expander. Scar tissue or tissue death can occur. Textured implants can cause breast implant-associated anaplastic large cell lymphoma (BIA-ALCL), a type of cancer.

### Flaps

Breasts can be remade using tissue from other parts of your body, known as flaps. These flaps are taken from the abdomen, buttocks, thigh, or from under the shoulder blade. Some flaps are completely removed and then sewn in place. Other flaps stay attached to your body but are slid over and sewn into place.

There are several risks associated with flaps, including death of fat in the flap, which can cause lumps. A hernia may result from muscle weakness. Problems are more likely to occur among those who have diabetes or who smoke.

### Implants and flaps

Some breasts are reconstructed with both implants and flaps. This method may give the reconstructed breast more volume to match the other breast. For any reconstruction, you may need surgery on your remaining breast to match the two breasts in size and shape.

## Nipple replacement

Like your breast, a nipple can be remade. To rebuild a nipple, a plastic surgeon can use surrounding tissues. Also, nipples can be remade with tissue from the thigh or the other nipple. Tissue can be darkened with a tattoo to look more like a nipple. It is important to note that while you can remake something to look like a nipple, it will not have the sensation of your real nipple. Also, a tattoo can be done to look like a nipple without having to take tissue from another part of the body.

## What to consider

Some things to consider when deciding to have flat closure or reconstruction after mastectomy:

- **Your desire** – You may have a strong feeling towards flat closure or one form of reconstruction after being given the options. Breast reconstruction should be a shared decision between you and your care team. Make your wishes known.
- **Health issues** – You may have health issues such as diabetes or a blood disorder that might affect or delay healing, or make longer procedures unsafe.
- **Tobacco use** – Smoking delays wound healing and can cause mastectomy flap death (necrosis), nipple-areola complex (NAC) necrosis in a nipple-sparing mastectomy, infection, and failure of implant-based reconstruction. In free flap reconstruction, smoking increases the risk of complications. You are encouraged to stop smoking prior to reconstruction.
- **Breast size and shape** – There are limits to the available sizes of breast implants. Very large breasts or breasts that lack tone or droop (called ptosis) might be difficult to match. Breast reduction surgery might be an option.
- **Body mass index (BMI)** – Those with an elevated BMI have an increased risk of infections and complications with breast reconstruction.

### If you smoke or vape, seek help to quit

Smoking or vaping nicotine greatly increases your chances of having side effects during and after surgery. Smoking and vaping can limit how well cancer treatment works and prevent wound healing. They also increase your chances of developing other cancers. Marijuana use might also affect the amount of anesthesia used during surgery.

Nicotine is the chemical in tobacco that makes you want to keep smoking and vaping. Nicotine withdrawal is challenging for most people who smoke or vape. The stress of having cancer may make it even harder to quit. If you smoke or vape, ask your care team about counseling and medicines to help you quit.

For online support, try these websites:

- [SmokeFree.gov](https://www.smokefree.gov)
- [BeTobaccoFree.gov](https://www.bethabaccofree.gov)
- [CDC.gov/tobacco](https://www.cdc.gov/tobacco)

## Key points

- Flat closure is done after a mastectomy in which the skin is tightened and sewn together without the addition of a breast implant.
- Breast reconstruction is surgery to rebuild the shape and look of the breast. If breast construction is something you might want, delayed reconstruction is recommended in those with IBC.
- Breasts that are fully removed in a mastectomy can be remade with breast implants, flaps, or both.
- Removed nipples can be remade with body tissue and/or tattooing.



### We want your feedback!

Our goal is to provide helpful and easy-to-understand information on cancer.

Take our survey to let us know what we got right and what we could do better.

[NCCN.org/patients/feedback](https://NCCN.org/patients/feedback)

“

When I was diagnosed with inflammatory breast cancer (IBC) the doctor told me to stay away from the internet, but I wanted to learn all I could. You need to learn so you can advocate for yourself. Not everyone has experience treating this disease. Just be sure to go to reputable sources for information.”

# 7

## Making treatment decisions

64 It's your choice

64 Questions to ask

71 Resources

**It's important to be comfortable with the cancer treatment you choose. This choice starts with having an open and honest conversation with your care team.**

## It's your choice

In shared decision-making, you and your doctors share information, discuss the options, and agree on a treatment plan. It starts with an open and honest conversation between you and your care team.

Treatment decisions are very personal. What is important to you may not be important to someone else.

Some things that may play a role in your decision-making:

- What you want and how that might differ from what others want
- Your religious and spiritual beliefs
- Your feelings about certain treatments
- Your feelings about pain or side effects
- Cost of treatment, travel to treatment centers, and time away from school or work
- Quality of life and length of life
- How active you are and the activities that are important to you

Think about what you want from treatment. Discuss openly the risks and benefits of specific treatments and procedures. Weigh options and share concerns with your care team. If you take the time to build a

relationship with your care team, it will help you feel supported when considering options and making treatment decisions.

## Second opinion

It is normal to want to start treatment as soon as possible. While cancer can't be ignored, there is time to have another doctor review your test results and suggest a treatment plan. This is called getting a second opinion, and it's a normal part of cancer care. Even doctors get second opinions!

Things you can do to prepare:

- Check with your insurance company about its rules on second opinions. There may be out-of-pocket costs to see doctors who are not part of your insurance plan.
- Make plans to have copies of all your records sent to the doctor you will see for your second opinion.

## Support groups

Many people diagnosed with cancer find support groups to be helpful. Support groups often include people at different stages of treatment. Some people may be newly diagnosed, while others may be finished with treatment. If your hospital or community doesn't have support groups for people with cancer, check out the websites listed in this book.

## Questions to ask

Possible questions to ask your doctors are listed on the following pages. Feel free to use these questions or come up with your own. Be clear about your goals for treatment and find out what to expect from treatment.

## Questions about testing and diagnosis

1. What tests will I have? How often will they be repeated?
  2. Will my insurance pay for these tests?
  3. What will you do to make me comfortable during testing?
  4. What if I am pregnant or want to become pregnant?
  5. When will I have a biopsy?
  6. What are the risks with a biopsy?
  7. How will my biopsy be performed?
  8. What else might be done during the biopsy?
  9. How soon will I know the results and who will explain them to me?
  10. How can I get a copy of the pathology report and other test results?
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## Questions about your care team's experience

1. What is your experience treating inflammatory breast cancer? What else do you treat?
  2. What is the experience of those on your team?
  3. How many people like me (of the same age, gender, race) have you treated?
  4. Will you be consulting with experts to discuss my care? Whom will you consult?
  5. How many procedures like the one you're suggesting have you done?
  6. Is this treatment a major part of your practice?
  7. How many of your patients have had complications? What were the complications?
  8. How many breast cancer surgeries have you done?
  9. What type of surgeries have you done? How many per year?
  10. Who will manage my day-to-day care?
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## Questions about options

1. What will happen if I do nothing?
  2. Which option is proven to work best for my cancer, age, overall health, and other factors?
  3. What are the possible complications and side effects? Are any life-threatening?
  4. What can be done to prevent or relieve the side effects of treatment?
  5. Am I a candidate for a clinical trial?
  6. Can I join a clinical trial at any time?
  7. What decisions must be made today?
  8. Is there a social worker or someone who can help me decide about treatment?
  9. Is there a hospital or treatment center you can recommend for breast cancer treatment?
  10. Can I go to one hospital for surgery and a different center for radiation therapy?
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## Questions about treatment

1. Which treatment(s) do you recommend and why?
  2. Does the order of treatment matter?
  3. When will I start treatment?
  4. How long will treatment take?
  5. What should I expect from treatment?
  6. What will you do to make me comfortable during treatment?
  7. How much will my insurance pay for treatment?
  8. Are there programs to help me pay for treatment?
  9. What are the chances my cancer will return after treatment?
  10. I would like a second opinion. Is there someone you can recommend?
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## Questions about surgery

1. How much of my breast will be removed?
  2. What will my breast look like after surgery?
  3. What lymph nodes might be removed during surgery?
  4. What long will recovery take and what should I expect?
  5. How long will it take me to recover from surgery?
  6. When will I be able to return to work or normal activities after surgery?
  7. How much pain will I be in and what will be done to manage my pain?
  8. What complications can occur from this surgery?
  9. What options are available if I do not like the look of my breast after surgery?
  10. What treatment will I have before, during, or after surgery?
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## Questions about radiation therapy

1. What type of radiation therapy (RT) will I have?
  2. What will you target?
  3. What is the goal of this RT?
  4. How many treatment sessions will I require?
  5. Do you offer this type of RT here? If not, should I be referred to someone who does?
  6. What side effects can I expect from RT?
  7. Should I eat or drink before RT?
  8. Will I be given medicine to help me relax during RT?
  9. What should I wear?
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## Resources

Many of these resources are also available en español and other languages.

### Breast Cancer Alliance

[breastcanceralliance.org](http://breastcanceralliance.org)

### Breastcancer.org

[breastcancer.org](http://breastcancer.org)

### Cancer Hope Network

[canceropennetwork.org](http://canceropennetwork.org)

### DiepC Foundation

[diepcfoundation.org](http://diepcfoundation.org)

### FORCE: Facing Our Risk of Cancer

#### Empowered

[facingourrisk.org](http://facingourrisk.org)

### GPAC Global Patient Advocacy Coalition

[GPACunited.org](http://GPACunited.org)

### Inflammatory Breast Cancer Research

#### Foundation

[ibcresearch.org](http://ibcresearch.org)

### MedlinePlus

[medlineplus.gov/breastcancer.html](http://medlineplus.gov/breastcancer.html)

### National Cancer Institute (NCI)

[cancer.gov/types/breast](http://cancer.gov/types/breast)

### Sharsheret

[sharsheret.org](http://sharsheret.org)

### Triage Cancer

[triagecancer.org](http://triagecancer.org)

### Unite for HER

[uniteforher.org](http://uniteforher.org)



# Words to know

**adjuvant therapy**

Treatment that is given to lower the chances of the cancer returning

**anti-estrogen**

A drug that stops estrogen from attaching to cells.

**areola**

A darker, round area of skin on the breast around the nipple.

**aromatase inhibitor (AI)**

A drug that lowers the level of estrogen in the body.

**axillary lymph node (ALN)**

A small disease-fighting structure that is near the armpit (axilla).

**axillary lymph node dissection (ALND)**

An operation that removes the disease-fighting structures (lymph nodes) near the armpit.

**bilateral diagnostic mammogram**

Pictures of the insides of both breasts that are made from a set of x-rays.

**bilateral oophorectomy**

An operation that removes both ovaries.

**biopsy**

A procedure that removes fluid or tissue samples to be tested for a disease.

**bone mineral density**

A test that measures the strength of bones.

**bone scan**

A test that makes pictures of bones to assess for health problems.

**boost**

An extra dose of radiation to a specific area of the body.

**breast implant**

A small bag filled with salt water, gel, or both that is used to remake breasts.

**breast reconstruction**

An operation that creates new breasts.

**cancer stage**

A rating of the outlook of a cancer based on its growth and spread.

**carcinoma**

A cancer of cells that line the inner or outer surfaces of the body.

**chest wall**

The layer of muscle, bone, and fat that protects the vital organs.

**clinical breast exam (CBE)**

Touching of a breast by a health expert to feel for diseases.

**clinical stage (c)**

The rating of the extent of cancer before treatment is started.

**clinical trial**

A type of research that assesses health tests or treatments.

**connective tissue**

Supporting and binding tissue that surrounds other tissues and organs.

**contrast**

A substance put into your body to make clearer pictures during imaging tests.

## Words to know

**core needle biopsy (CNB)**

A procedure that removes tissue samples with a hollow needle. Also called core biopsy.

**deoxyribonucleic acid (DNA)**

A chain of chemicals in cells that contains coded instructions for making and controlling cells.

**diagnostic bilateral mammogram**

Pictures of the insides of both breasts that are made from a set of x-rays.

**duct**

A tube-shaped structure through which milk travels to the nipple.

**ductal carcinoma**

A cancer derived from cells that line small tube-shaped vessels.

**endocrine therapy**

A cancer treatment that stops the making or action of estrogen. Also called hormone therapy.

**estrogen**

A hormone that plays a role in breast development.

**estrogen receptor (ER)**

A protein inside cells that binds to estrogen.

**estrogen receptor-negative (ER-)**

A type of breast cancer that doesn't use estrogen to grow.

**estrogen receptor-positive (ER+)**

A type of breast cancer that uses estrogen to grow.

**fertility specialist**

An expert who helps people have babies.

**fine-needle aspiration (FNA)**

A procedure that removes tissue samples with a very thin needle.

**flat closure**

Procedure done after a mastectomy in which the skin is tightened and sewn together without the addition of a breast implant.

**gene**

Coded instructions in cells for making new cells and controlling how cells behave.

**genetic counseling**

Expert guidance on the chance for a disease that is passed down in families.

**hereditary breast cancer**

Breast cancer likely caused by abnormal genes passed down from biological parent to child.

**histology**

The structure of cells, tissue, and organs as viewed under a microscope.

**hormone**

A chemical in the body that triggers a response from cells or organs.

**hormone receptor-negative cancer (HR-)**

Cancer cells that don't use hormones to grow.

**hormone receptor-positive cancer (HR+)**

Cancer cells that use hormones to grow.

**human epidermal growth factor receptor 2 (HER2)**

A protein on the surface of a cell that sends signals for the cell to grow.

**imaging test**

A test that makes pictures (images) of the insides of the body.

**immune system**

The body's natural defense against infection and disease.

**immunohistochemistry (IHC)**

A lab test of cancer cells to find specific cell traits involved in abnormal cell growth.

**inflammatory breast cancer**

A type of breast cancer in which the breast looks red and swollen and feels warm to the touch.

**infraclavicular**

The area right below the collarbone.

**in situ hybridization (ISH)**

A lab test of the number of a gene.

**internal mammary**

The area along the breastbone.

**invasive breast cancer**

The growth of breast cancer into the breast's supporting tissue (stroma).

**linear accelerator (linac)**

A machine that delivers radiotherapy treatments.

**lobular carcinoma**

A breast cancer that started in cells that line the breast glands (lobules).

**lobule**

A gland in the breast that makes breast milk.

**luteinizing hormone-releasing hormone (LHRH)**

A hormone in the brain that helps control the making of estrogen by the ovaries.

**lymph**

A clear fluid containing white blood cells.

**lymphadenopathy**

Lymph nodes that are abnormal in size or consistency.

**lymphatic system**

Germ-fighting network of tissues and organs that includes the bone marrow, spleen, thymus, lymph nodes, and lymphatic vessels. Part of the immune system.

**lymphedema**

Swelling in the body caused by a buildup of fluid called lymph.

**lymph node**

A small, bean-shaped disease-fighting structure.

**magnetic resonance imaging (MRI)**

A test that uses radio waves and powerful magnets to make pictures of the insides of the body.

**mammogram**

A picture of the insides of the breast that is made using x-rays.

**mastectomy**

An operation that removes the whole breast.

**medical history**

A report of all your health events and medicines.

**medical oncologist**

A doctor who is an expert in cancer drugs.

**menopause**

12 months after the last menstrual period.

**modified radical mastectomy**

An operation that removes the whole breast and lymph nodes under the arm (axilla).

**mutation**

An abnormal change.

**neoadjuvant treatment**

A treatment that is given before the main treatment to reduce the cancer. Also called preoperative treatment if given before an operation.

**nipple-areola complex (NAC)**

The ring of darker breast skin is called the areola. The raised tip within the areola is called the nipple.

**noninvasive breast cancer**

Breast cancer that has not grown into tissue from which it can spread.

**palpable adenopathy**

Lymph nodes that feel abnormal in size or consistency.

**pathologic stage (p)**

A rating of the extent of cancer given after examining tissue removed during surgery.

**pathologist**

A doctor who's an expert in testing cells and tissue to find disease.

**positron emission tomography (PET)**

A test that uses radioactive material to see the shape and function of body parts.

**postmenopause**

The state of having no more menstrual periods.

**premenopause**

The state of having menstrual periods.

**primary tumor**

The first mass of cancer cells.

**progesterone (PR)**

A hormone involved in sexual development, periods, and pregnancy.

**prognosis**

The likely course and outcome of a disease based on tests.

**radiation therapy (RT)**

A treatment that uses high-energy rays. Also called radiotherapy.

**radical mastectomy**

An operation that removes the whole breast, lymph nodes under the arm (axilla), and chest wall muscles under the breast.

**recurrence**

The return of cancer after a cancer-free period.

**selective estrogen receptor degrader (SERD)**

A drug that blocks and destroys estrogen receptors.

**selective estrogen receptor modulator (SERM)**

A drug that blocks the effect of estrogen inside of cells.

**sentinel lymph node (SLN)**

The first lymph node to which cancer cells spread after leaving a tumor.

**sentinel lymph node biopsy (SLNB)**

An operation to remove the disease-fighting structures (lymph nodes) to which cancer first spreads. Also called sentinel lymph node dissection.

**side effect**

An unhealthy or unpleasant physical or emotional response to treatment.

**supportive care**

Health care that includes symptom relief but not cancer treatment. Also called palliative care or best supportive care.

**supraclavicular**

The area right above the collarbone.

**surgical margin**

The normal-looking tissue around a tumor removed during an operation.

**systemic therapy**

Drug treatment that works throughout the body.

**total mastectomy**

An operation that removes the entire breast with an aesthetic flat closure. Also called simple mastectomy.

**triple-negative breast cancer (TNBC)**

A breast cancer that does not use hormones or the HER2 protein to grow.

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This patient guide is based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer, Version 4.2023. It was adapted, reviewed, and published with help from the following people:

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*Duke Cancer Institute*

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\* Reviewed this patient guide. For disclosures, visit [NCCN.org/disclosures](https://www.NCCN.org/disclosures).

# NCCN Cancer Centers

Abramson Cancer Center  
at the University of Pennsylvania  
*Philadelphia, Pennsylvania*  
800.789.7366 • [pennmedicine.org/cancer](http://pennmedicine.org/cancer)

Case Comprehensive Cancer Center/  
University Hospitals Seidman Cancer Center and  
Cleveland Clinic Taussig Cancer Institute  
*Cleveland, Ohio*  
UH Seidman Cancer Center  
800.641.2422 • [uhhospitals.org/services/cancer-services](http://uhhospitals.org/services/cancer-services)  
CC Taussig Cancer Institute  
866.223.8100 • [my.clevelandclinic.org/departments/cancer](http://my.clevelandclinic.org/departments/cancer)  
Case CCC  
216.844.8797 • [case.edu/cancer](http://case.edu/cancer)

City of Hope National Medical Center  
*Duarte, California*  
800.826.4673 • [cityofhope.org](http://cityofhope.org)

Dana-Farber/Brigham and Women's Cancer Center |  
Massachusetts General Hospital Cancer Center  
*Boston, Massachusetts*  
617.732.5500 • [youhaveus.org](http://youhaveus.org)  
617.726.5130 • [massgeneral.org/cancer-center](http://massgeneral.org/cancer-center)

Duke Cancer Institute  
*Durham, North Carolina*  
888.275.3853 • [dukecancerinstitute.org](http://dukecancerinstitute.org)

Fox Chase Cancer Center  
*Philadelphia, Pennsylvania*  
888.369.2427 • [foxchase.org](http://foxchase.org)

Fred & Pamela Buffett Cancer Center  
*Omaha, Nebraska*  
402.559.5600 • [unmc.edu/cancercenter](http://unmc.edu/cancercenter)

Fred Hutchinson Cancer Center  
*Seattle, Washington*  
206.667.5000 • [fredhutch.org](http://fredhutch.org)

Huntsman Cancer Institute at the University of Utah  
*Salt Lake City, Utah*  
800.824.2073 • [huntsmancancer.org](http://huntsmancancer.org)

Indiana University Melvin and Bren Simon  
Comprehensive Cancer Center  
*Indianapolis, Indiana*  
888.600.4822 • [www.cancer.iu.edu](http://www.cancer.iu.edu)

Mayo Clinic Comprehensive Cancer Center  
*Phoenix/Scottsdale, Arizona*  
*Jacksonville, Florida*  
*Rochester, Minnesota*  
480.301.8000 • *Arizona*  
904.953.0853 • *Florida*  
507.538.3270 • *Minnesota*  
[mayoclinic.org/cancercenter](http://mayoclinic.org/cancercenter)

Memorial Sloan Kettering Cancer Center  
*New York, New York*  
800.525.2225 • [mskcc.org](http://mskcc.org)

Moffitt Cancer Center  
*Tampa, Florida*  
888.663.3488 • [moffitt.org](http://moffitt.org)

O'Neal Comprehensive Cancer Center at UAB  
*Birmingham, Alabama*  
800.822.0933 • [uab.edu/onealcancercenter](http://uab.edu/onealcancercenter)

Robert H. Lurie Comprehensive Cancer Center  
of Northwestern University  
*Chicago, Illinois*  
866.587.4322 • [cancer.northwestern.edu](http://cancer.northwestern.edu)

Roswell Park Comprehensive Cancer Center  
*Buffalo, New York*  
877.275.7724 • [roswellpark.org](http://roswellpark.org)

Siteman Cancer Center at Barnes-Jewish Hospital  
and Washington University School of Medicine  
*St. Louis, Missouri*  
800.600.3606 • [siteman.wustl.edu](http://siteman.wustl.edu)

St. Jude Children's Research Hospital/  
The University of Tennessee Health Science Center  
*Memphis, Tennessee*  
866.278.5833 • [stjude.org](http://stjude.org)  
901.448.5500 • [uthsc.edu](http://uthsc.edu)

Stanford Cancer Institute  
*Stanford, California*  
877.668.7535 • [cancer.stanford.edu](http://cancer.stanford.edu)

The Ohio State University Comprehensive Cancer Center -  
James Cancer Hospital and Solove Research Institute  
*Columbus, Ohio*  
800.293.5066 • [cancer.osu.edu](http://cancer.osu.edu)

The Sidney Kimmel Comprehensive  
Cancer Center at Johns Hopkins  
*Baltimore, Maryland*  
410.955.8964  
[www.hopkinskimmelcancercenter.org](http://www.hopkinskimmelcancercenter.org)

The UChicago Medicine Comprehensive Cancer Center  
*Chicago, Illinois*  
773.702.1000 • [uchicagomedicine.org/cancer](http://uchicagomedicine.org/cancer)

The University of Texas MD Anderson Cancer Center  
*Houston, Texas*  
844.269.5922 • [mdanderson.org](http://mdanderson.org)

UC Davis Comprehensive Cancer Center  
*Sacramento, California*  
916.734.5959 • 800.770.9261  
[health.ucdavis.edu/cancer](http://health.ucdavis.edu/cancer)

UC San Diego Moores Cancer Center  
*La Jolla, California*  
858.822.6100 • [cancer.ucsd.edu](http://cancer.ucsd.edu)

UCLA Jonsson Comprehensive Cancer Center  
*Los Angeles, California*  
310.825.5268 • [cancer.ucla.edu](http://cancer.ucla.edu)

UCSF Helen Diller Family Comprehensive  
Cancer Center  
*San Francisco, California*  
800.689.8273 • [cancer.ucsf.edu](http://cancer.ucsf.edu)

University of Colorado Cancer Center  
*Aurora, Colorado*  
720.848.0300 • [coloradocancercenter.org](http://coloradocancercenter.org)

University of Michigan Rogel Cancer Center  
*Ann Arbor, Michigan*  
800.865.1125 • [rogelcancercenter.org](http://rogelcancercenter.org)

University of Wisconsin Carbone Cancer Center  
*Madison, Wisconsin*  
608.265.1700 • [uwhealth.org/cancer](http://uwhealth.org/cancer)

UT Southwestern Simmons  
Comprehensive Cancer Center  
*Dallas, Texas*  
214.648.3111 • [utsouthwestern.edu/simmons](http://utsouthwestern.edu/simmons)

Vanderbilt-Ingram Cancer Center  
*Nashville, Tennessee*  
877.936.8422 • [vicc.org](http://vicc.org)

Yale Cancer Center/Smilow Cancer Hospital  
*New Haven, Connecticut*  
855.4.SMILOW • [yalecancercenter.org](http://yalecancercenter.org)



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